UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN

KEITH T. WILLIAMS, individually on behalf of himself and all others similarly situated,

Plaintiff,

v.

FORD MOTOR COMPANY, a Delaware corporation.

Defendant.

Cause No. 22-cv-12957

CLASS ACTION COMPLAINT

JURY TRIAL DEMANDED

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Plaintiff Keith T. Williams, individually on behalf of himself and all others similarly situated ("the Class"), files this Complaint against Defendant Ford Motor Company. This lawsuit is based upon the investigation of counsel, the review of scientific and automotive industry papers, and the investigation of experts with relevant education and experience. In support thereof, Plaintiff states as follows:

I. INTRODUCTION

1. Ford Motor Company ("Ford") has designed, manufactured, distributed, and sold hundreds of thousands of 2011-present model year Ford diesel trucks equipped with 6.7L Power Stroke diesel engines (the "Class Vehicles") which contain defective high-pressure fuel injection pumps (the "CP4 pump") supplied by automotive component parts supplier Robert Bosch GmbH ("Bosch"). Ford has concealed from consumers the crucial fact that the CP4 pump has a fragile and unstable design, which causes metal parts to rub against each other on the first day of operation and through the life of the vehicle. This friction generates metal shavings that contaminate the fuel system, which inevitably will cause component wear, and can lead to catastrophic engine failure. Ford never disclosed this critical defect to consumers at the point of sale or in any other communication.

2. The design of the CP4 pump is fundamentally flawed in several respects. While cheap and simple, the pump is—as others have described it—a ticking "time bomb." As Ford knew, the CP4 pump's fragile design—which

generates metal shavings in the fuel system regardless of fuel quality—is particularly incompatible with U.S. diesel fuel, which is "dry" and not lubricious. The CP4 pump uses the fuel itself for lubrication, and the design of the pump requires a cam and two pumping cylinders with individual rollers to seamlessly roll together without skipping, sliding, sticking, or wearing to operate effectively. Since standard U.S. diesel fuel is not sufficiently lubricious, the pump is unable to protect itself when operating under anything less than pristine conditions. The wear on the cam and rollers is therefore accelerated, producing an even greater number of tiny metal shavings that disperse throughout the high-pressure fuel injection system.

3. The release of these metal shavings into the fuel system can be catastrophic, as it eventually causes the fuel injectors to become blocked and leads to an entire shutdown of the engine. Repair costs for a catastrophic failure are at least $10,000 and are time-intensive; however, any such repair is futile because it will not actually fix the issue so long as the CP4 pump is replaced with another CP4 pump.

4. Catastrophic failure can occur as early as mile one, as the fuel injection disintegration process begins at the very first fill of the tank and start of the engine, with pump components beginning to deteriorate and dispersing metal shavings throughout the internal engine components and fuel supply system. And catastrophic failure often causes the vehicle to shut off while in motion and renders it unable to be restarted because the vehicle's fuel injection system and engine component parts

have been completely contaminated with metal shards. This presents an inherent and substantial risk to consumer safety—one which Ford itself has recognized in the past—and one which Plaintiff was not aware of prior to purchasing the Class Vehicles.

5. Even short of catastrophic failure, the fragile pump design will inevitably lead to pump component wear that damages the fuel injectors, or causes them to inject fuel at times and rates which cause significant harm to the component parts of the vehicle's engine. There are numerous ways in which the defective pump can harm the engine and related components, including; (1) over-fueling, which decreases fuel economy; (2) broken injector tips; (3) fuel spray hitting the cylinder wall, causing dilution of the lube oil, which damages the engine; (4) over-heating of cylinders causing wear damage to the cylinders; (5) melted or twisted pistons; (6) damaged exhaust valves; (7) damaged turbochargers; (8) hydraulic lock; (9) damaged cylinder heads; (10) damaged exhaust manifolds; and (11) damage and/or loss of emission control (including increases in NOx, particulates, and carbon dioxide).

6. Some victims of Ford's scheme are businesses which own several vehicles and have suffered multiple failures. Others have spent hundreds or thousands of dollars on repairs and mitigation efforts. The Class Vehicles themselves come with a hefty price tag, ranging from approximately $42,000 to $67,000. Diesel

fans pay a premium of approximately $5,000 to $8,000 for their vehicles because diesel engines are traditionally expected to last for a range of 500,000 to 800,000 miles.[1]

7. Well before Ford ever chose to use the CP4 pump, the issue of U.S. diesel fuel lubrication was well-known throughout the auto manufacturing industry, but was completely disregarded in the design, manufacture, marketing, and sales or leases of the Class Vehicles. Ford, as well as fellow domestic automotive manufacturers GM and FCA, had industry-wide experience with catastrophic fuel injection pump failures when cleaner diesel standards were first implemented in the 1990s. By 2002, the Truck & Engine Manufacturers Association ("EMA")—of which Ford is a member company[2]—acknowledged that the lower lubricity of American diesel could cause catastrophic failure in high-pressure fuel injection system components.

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[1] *See* WorkTruckOnline.com, *Pros & Cons: Diesel vs. Gas in Class 3-4 Trucks* (Nov. 3, 2011), available at https://www.worktruckonline.com/147984/pros-and-cons-of-gas-vs-diesel-in-class-3-4-trucks; PickupTrucks.com, *Considering a Diesel Pickup? Here Are Costs to Ponder* (Sept. 8, 2018), available at https://news.pickuptrucks.com/2018/09/considering-a-diesel-pickup-here-are-costs-to-ponder.html.

[2] *See* Truck & Engine Manufacturers Association (EMA) membership webpage, http://www.truckandenginemanufacturers.org/companies/ (last accessed Feb. 25, 2020).

8. Ford and its affiliates knowingly and intentionally deceived American consumers through its consistent representations to consumers in order to sell the Class Vehicles. Through representations by Ford dealers, and through Ford's advertisements online, in print, on TV, and on the radio, Ford promised consumers the continued reliability of their diesel engines, but with increased fuel efficiency and power at greater fuel efficiency. These representations were false, and Ford failed to disclose the defect, passing along the substantial cost of the defect to consumers.

9. No Plaintiff—indeed, no reasonable consumer—would have purchased or leased these vehicles if Ford's disclosures had been materially truthful. And certainly, no consumer would have paid a premium for these defective trucks or paid the price they were charged.

10. When consumers have complained, in order to deny warranty claims, Ford has blamed vehicle owners for the presence of metal wear particles in the fuel, even though these fragments were produced by the pump's faulty design. Ford has further sought to delay vehicle owners' discovery of the damage through re-defining "failure" and delaying repairs, in the hopes that the final and catastrophic failure occurs out of warranty.

11. Plaintiff accordingly brings this class action complaint to recover on behalf of the Class[3] all relief to which they are entitled, including but not limited to recovery of the purchase price of their vehicles, compensation for overpayment and diminution in value of their vehicles, out-of-pocket and incidental expenses, disgorgement of Ford's unjustly derived profits, and an injunction compelling Ford to replace or recall and fix the Class Vehicles.

II. PARTIES

A. The Plaintiff

12. Plaintiff Keith T. Williams is a citizen of the State of South Carolina, and domiciled in Abbeville, South Carolina. On or around April 11, 2017, Plaintiff purchased a new 2017 Ford Power Stroke diesel F250 (Platinum) (for the purpose of this paragraph and the next three paragraphs, the "Class Vehicle" or "Truck") for approximately $80,614 from Lake Keowee Ford, an authorized Ford dealership in Seneca, South Carolina. Plaintiff uses his F250 as his personal vehicle and daily travel to get to and from work and for daily activities.

13. On February 26, 2021, Plaintiff was driving his Truck on I-20, headed toward Augusta, Georgia, when he filled up with diesel fuel at a BP station. After getting back on the highway, he received a "Reduced Power Model" warning

[3] The Class is comprised of all persons or entities who purchased or leased one or more of the Class Vehicles in South Carolina.

indicator light. He verified the warning in his operator's manual, and was able to drive home at a lower power level. He made an appointment with Herlong Ford in Edgefield, South Carolina. This dealership initially blamed the condition of his vehicle on gas in his fuel.

14. Plaintiff owns and operates heavy equipment that runs on diesel, including dozers, excavators, and tractors. He is experienced with diesel machinery and certainly understands that a diesel owner cannot put gasoline in his/her vehicle. Plaintiff went to the service department and requested a sample of his fuel; Herlong technicians then pulled a sample from the fuel tank line running to the fuel filter/water separator. Plaintiff then took his fuel sample to a lab at the South Carolina Department of Transportation. The DOT lab confirmed that there was no gas in his diesel fuel.

15. On July 15, 2022, Plaintiff was driving home when his Truck again entered "Reduced Power Mode" and shut down. He coasted into a pull-off area and had the Truck towed to George Ballentine Ford, in Greenwood, South Carolina. Ballentine told him that his fuel pump had come apart and injected metal into the fuel system. The total cost of repair that Plaintiff had to pay out of pocket was $11,541.71.

16. In the days and weeks preceding Plaintiff's purchase, and in contemplating his vehicle needs, Plaintiff saw and recalled Ford's television

commercials, internet advertisements, sales brochures, and heard statements from Ford dealership sales representatives wherein Ford claimed the Power Stroke diesel truck, which Plaintiff ultimately purchased, had superior horsepower, fuel economy, reliability, and durability compared to other trucks in the American market. Most importantly, Plaintiff relied on representations from Ford through the means listed above that the Class Vehicle was compatible with American diesel fuel, as all Ford advertisements Plaintiff ever observed contained representations of the Class Vehicles driving in America as if they were compatible with U.S. diesel fuel—but they are not. Absent these representations, Plaintiff would not have purchased the vehicle, or would have paid less for it, because it is unfit for its ordinary use. Unbeknownst to Plaintiff, at the time of acquisition, the Class Vehicle contained a defective CP4 fuel injection system that was particularly unsuitable for American vehicles, and consequently the vehicle could not deliver the advertised combination of durability, power, reliability, and fuel efficiency of diesel that Plaintiff relied upon. Neither Ford nor any of its agents, dealers, or other representatives informed Plaintiff or Class members of the existence of the unlawfully and unexpectedly defective nature of the Ford Power Stroke diesel engine's CP4 high-pressure fuel pump system—which is common to all Class Vehicles—prior to purchasing. Had Ford disclosed the defect, Plaintiff—through his research prior to purchase—would have received these disclosures, and either would not have purchased the Class

Vehicle, or would have paid less for it. Accordingly, Plaintiff and each Class member suffered concrete economic injury as a direct and proximate result of Ford's wrongful, deceptive conduct. As deemed appropriate, Plaintiff's and each other Class member's ascertainable losses include, but are not limited to, the full purchase price of the truck, out-of-pocket losses by overpaying for the vehicles at the time of purchase, decreased performance and fuel economy of the vehicles, diminished value of the vehicles and benefit of the bargain damages. Ford has been unjustly enriched as a result, and Plaintiff is entitled to a pro rata share of Ford's disgorged profits.

17. Plaintiff also paid a premium for his Truck. Based on his research and knowledge of trucks, Plaintiff knew that diesel trucks were more expensive than a comparable truck that ran on gas, but he purchased the Truck based on his belief that it would be more durable compared to a gas engine, with superior torque and towing capabilities. The premium for a diesel truck compared to a gasoline equivalent is approximately $5,000-$8,000. Plaintiff accordingly overpaid for his Truck by at least the value of this premium.

B. The Defendant

18. Defendant Ford Motor Company ("Ford") is a publicly traded corporation organized under the laws of the State of Delaware with its principal place of business at One American Road, Dearborn, Michigan 48126. Defendant Ford

Motor Company can be served with process through its agent The Corporation Company, 40600 Ann Arbor Road E. Ste. 201, Plymouth, Michigan, 48170.

19. Defendant Ford is in the business of designing, manufacturing, distributing, and selling Ford automobiles in this District, and in the jurisdiction of the Named Plaintiff's Class Vehicle purchase. Ford and/or its agents designed, manufactured, and installed the engine systems in the Class Vehicles. Ford also developed and disseminated the materially misrepresentative owner's manuals and warranty booklets, advertisements, and other intentionally unreasonable and deceptive promotional materials relating to the Class Vehicles. Ford also designed advertising material that it sent to Ford Dealerships for the purpose of having dealers distribute these to consumers, and Ford authorized dealers to communicate with consumers about the performance of the vehicles, and Ford ensured that the dealership was a place where Ford could disclose material facts to prospective buyers.

III. VENUE AND JURISDICTION

20. Venue is proper in this District under 28 U.S.C. § 1391 in light of the following: (1) Defendant Ford Motor Company's principal place of business is in this District and Ford has marketed, advertised, sold and leased the Class Vehicles within this District; and (2) many of the acts and transactions giving rise to this action occurred in this District, including, *inter alia*, Ford's promotion, marketing,

distribution, and sale of vehicles containing the defective Bosch CP4 high-pressure fuel pump in this District. Further, a significant number of the Class Vehicles were registered in this District and thousands of Class Vehicles were in operation in this District. Venue is also proper under 18 U.S.C. § 1965(a) because Ford is subject to personal jurisdiction in this District as alleged, *infra*, and Ford has agents, *i.e.*, Ford-certified dealerships, located in this District.

21. The Court has jurisdiction over this action pursuant to the Class Action Fairness Act ("CAFA"), 28 U.S.C. § 1332(d), because at least one Class member is of diverse citizenship from one Defendant, there are more than 100 Class members, and the aggregate amount in controversy exceeds $5 million, exclusive of interests and costs.

22. This Court has personal jurisdiction over Defendant. Ford has committed and continues to commit acts giving rise to this action within Michigan and within this judicial District. Ford has established minimum contacts within the forum such that the exercise of jurisdiction over Ford would not offend traditional notions of fair play and substantial justice. In conducting business within the State of Michigan, and specifically, within this judicial District, Ford derives substantial revenue from its activities and its products being sold, used, imported, and/or offered for sale in Michigan and this judicial District.

IV. FACTUAL ALLEGATIONS

A. The Class Vehicles

23. For purposes of this Complaint, the "Class Vehicles" consist of the following vehicles: 2011-present Model Year Ford-manufactured diesel-fueled automobiles equipped with a 6.7L Power Stroke engine. All vehicles falling under this Class Vehicle group were manufactured with the defective CP4 fuel injection pump.

B. Ford profits from the rise of diesel vehicles in the United States.

24. Diesel engines have long enjoyed a loyal following in some U.S. market segments because of their reliability, fuel efficiency, and power. Diesel engines produce higher torque, even at low revolutions per minute ("RPM"), making them popular in buses, heavy-duty pickups, and vans, including commercial vehicles, farm trucks, and ambulances.

25. The key benefits of diesel engines over their gasoline counterparts are the following:

> **(a) Durability:** Diesel (compression ignition) engines are, by design, stronger and more robust than gasoline (spark ignition) engines, and their long life and low maintenance are among the reasons for their popularity.
>
> **(b) Fuel Efficiency:** The diesel engine is 20-35% more efficient than a gasoline engine, because the compression ignition cycle (and greater compression ratio) is more thermodynamically efficient than the spark ignition cycle, and because diesel fuel has a greater energy content on a

> per gallon basis than gasoline. As a result, a diesel engine's fuel cost per mile is expected to be lower than gasoline.
>
> **(c) Torque and Power:** Diesel engines provide more torque, especially at low engine speeds, which leads to better acceleration and higher towing capacity. Modern diesel engines operating at higher speed can now match or exceed gasoline engines in terms of peak power. This combination of torque and power is another reason why some customers prefer diesel.

26. Most Class 2A, 2B, and 3 (1500-3500) series pickup trucks, as well as certain sports utility vehicles sold by the Big Three Automakers (Ford, GM, and FCA)—including the Class Vehicles at issue in this case—offer both a gasoline and diesel option. Because of the features and advantages listed above, buyers are willing to pay a premium of $5,000-$8,000 more for the diesel-powered versions.[4]

27. The diesel combustion process, invented by Rudolph Diesel over a century ago, uses a hydrocarbon-based fuel which is substantially different than gasoline. Diesel fuel is a heavier and less refined mix of hydrocarbons and is designed to self-ignite when mixed with air under elevated temperatures and pressures. In the diesel combustion process, the fuel is pumped to a very high pressure and then forced into an injector through very small spray holes. This fuel is atomized into spray plumes of fine droplets in the engine combustion chamber. The

[4] *See* WorkTruckOnline.com, *supra* note 1; PickupTrucks.com, *supra* note 1.

droplets rapidly evaporate and mix with heated air and spontaneously ignite, thus releasing the energy to drive the piston and pressurize the fuel.

28. Since the invention and early development of the diesel engine more than 100 years ago, the injection of fuel into the cylinder has been one of its greatest technical challenges. Earlier versions of the fuel injection system were designed as a pump-line-nozzle arrangement where a fuel pump delivered fuel directly to each injector via its own fuel line. As emission and fuel economy standards have become more stringent, and customer demands for performance have increased, diesel manufacturers switched to a high-pressure, common rail system, starting in Europe in the 1990s.

29. In a common-rail fuel system, a high pressure pump supplies fuel to a reservoir (a pressure containment vessel) known as the fuel rail. The rail holds an ample supply of pressurized fuel available to be injected (or "metered") into the engine power cylinders by the fuel injectors. The flow of fuel in each injector is managed by a complex electronic control system, which is programmed by sophisticated algorithms and calibration files. The key advancement with the common rail system is that each injector is capable of injecting in multiple precise pulses of fuel and at varying times based on driving conditions.

30. The most complex and expensive part of the common rail fuel injection system are the high-pressure components, including the high-pressure pump, the fuel rails, and the injectors.

31. One of the key benefits of common rail technology is the ability to have multiple fuel injection events in a single injection cycle. Multiple injections, executed by lifting the injector nozzle needle, are used to carefully meter fuel into the cylinder which smooths out the combustion event resulting in lower noise and lower emissions.[5] Modern engines may have multiple injection events, including post injection of fuel used to release fuel into the exhaust stream for the purpose of heating up the after-treatment components to reduce emissions.

32. In sum, the key benefits of modern common rail fuel system are, among others:[6]

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[5] The injectors spray an exceedingly fine mist of diesel fuel into the cylinder, where it ignites and powers the engine. The finer the mist, the less emissions, because the combustion process is more homogenous, which has at least two beneficial effects: (1) the smaller droplets evaporate and mix more readily with the air, preventing the development of fuel-rich "pockets" which product particulate matter; and (2) homogenized levels of heat mean there are fewer high peak temperatures, which lead to formation of NOx. The net effect of the high-pressure system is less NOx and particular matter.

[6] *See* https://www.bosch-mobility-solutions.com/en/products-and-services/passenger-cars-and-light-commercial-vehicles/powertrain-systems/common-rail-system-piezo/ (last accessed Dec. 2, 2022).

- Providing pressurized fuel to well above 2,000 bar[7] across most of the operating range of the engine (previous mechanical fuel systems could only achieve high pressure at high engine speeds).
- Multiple injection events, accurately timed and measured for the precise engine operating conditions to meet stringent noise and emissions regulations, including the following:
  - Cold-start ability can be improved by early pre-injections to avoid the need for glow plugs.[8]
  - Engine noise can be lowered by pre-injections of fuel prior to main injection to produce power.
  - Aftertreatment systems (particulate filters) can be regenerated by very late post injections.
  - Injection rates can be digitally "shaped" to give an optimum rate of injected fuel to better control the diesel heat release rate, which minimizes NOx emissions.
  - Exhaust particulates can also be lowered by injection "post" or late small amounts of fuel.

[7] A bar is a unit of measure for pressure. One bar is about 14.8 pounds per square inch; 1,800 bar is equivalent to about 27,000 pounds per square inch.

[8] A glow plug is a heating device which aids in the starting of diesel engines.

- High reliability and durability – common rail systems in Europe have been shown to be more reliable and durable than previous mechanical fuel systems if properly fueled and maintained.
- Less maintenance – modern common rail systems are designed to be self-adapting and require little maintenance.
- Less noise, vibration and handling problems – precise control over the injection and combustion events reduces engine noise, runs more quietly, produces less shaking and shock, and produces better operator control over the acceleration of the vehicle. High pressures are only generated in the centralized fuel pump rather than in individual mechanical injectors, which reduces engine vibration and gear train torques and noises.
- Higher injection pressure – pressures up to 2,500 bar (36,000 pounds per square inch) are only achievable with common rail fuel systems. The higher pressures are necessary for improved fuel atomization and more complete combustion.
- Better engine combustion management – the precision control offered by common rail reduces the mechanical strains on the engine, including peak cylinder pressures, temperatures, and observing exhaust aftertreatment system limits.

33. From the outset, Ford was in competition with fellow "Big Three" auto manufacturers like General Motors ("GM") and Fiat Chrysler ("FCA"), each racing to dominate the growing American diesel vehicle market. Ford looked to the international automotive parts supplier Bosch to increase the fuel efficiency and power of its diesel engines. The heart of this diesel revolution would be powered by Bosch's more durable CP3 fuel injection pump, the predecessor to the CP4 fuel injection pump at issue in this suit. The reliability of the CP3 became key to the "million-mile" reputation of diesel truck engines in the United States. In fact, Cummins, who supplies diesel engines to FCA for installation in FCA's trucks, had previously switched to the CP4 in 2019. However, after only two years of production, Cummins also abandoned the CP4 and decided on "reverting back to the tried and true Bosch CP3 high-pressure fuel pump."[9] As this article explains, "beginning on 2019 models the 6.7L Cummins was fitted with a Bosch CP4.2. The CP4.2 is the same high-pressure fuel pump that has proven problematic and prone to premature failure in LML Duramax applications. This switch back to the CP3 ***is a highly welcomed move for Cummins fans***, who will have ***peace of mind*** knowing that their injection pump ***will be just as reliable as the engine itself.***"[10]

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[9] Mike McGlothlin, *Cummins Is King (Again)*, DRIVINGLINE (Dec. 18, 2020), https://www.drivingline.com/articles/cummins-is-king-again/.

[10] *Id.* (emphasis added).

34. Americans paid a premium for the increased reliability, fuel efficiency, and power of diesel—and Ford claimed to continue to deliver advances in diesel engine technology. In its advertisements and press releases—both online and in printed material—Ford claimed that the Power Stroke engines, which contained the CP4, would maintain reliability while also increasing fuel efficiency and power. *See infra* § IV.J. The over-simplified design of the CP4 fuel pump rendered it cheaper to manufacture, but also increased its need for high lubricity fuel, and increased the likelihood that the ultimate failure would be catastrophic.

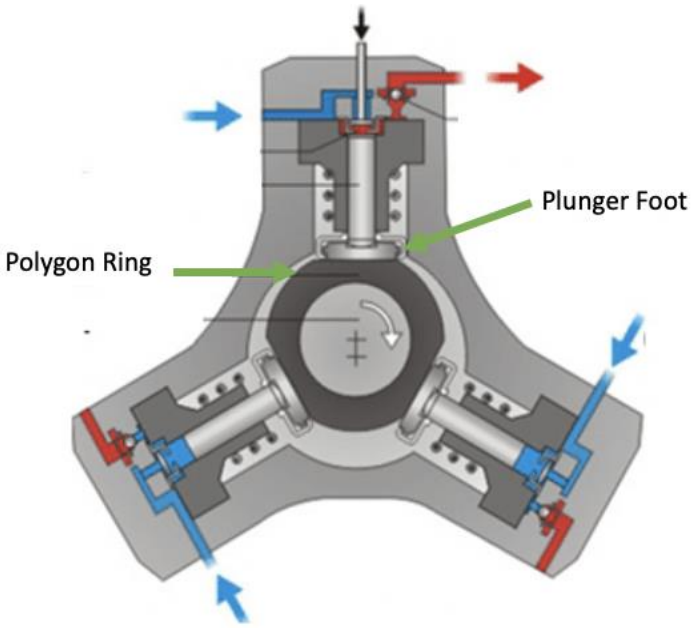
C. The fragile CP4 fuel pump design

35. The Bosch CP4 fuel pump is directly coupled to the engine, which means it is operating whenever the engine is operating. Since the CP4 is a critical part of the engine system, it must be designed for very long life and must be capable of operating with commercially available fuel. A sound and robust design would also make it tolerant to fuels that are commercially sold, but do not meet the proper requirements. It should also be designed to withstand some level of foreseeable inadvertent mistreatment by the customer, *e.g.*, inadvertent misfueling, running out of fuel, delaying a filter change, or draining the water separator.

36. The CP4 operates at higher pressures than its predecessor, the CP3, and has inherently higher Hertz contact stresses than the CP3, which exacerbates the wearing of the pump parts. The CP3 pump has three pumping cylinders and

plungers, and a polygon ring on an eccentric camshaft. As the camshaft rotates, the polygon is moved in a sliding manner against the plunger foot plate and converting rotational (circular) motion into linear (up and down) motion. Below is a diagram of the CP3 pump:

Figure 1: CP3 Pump

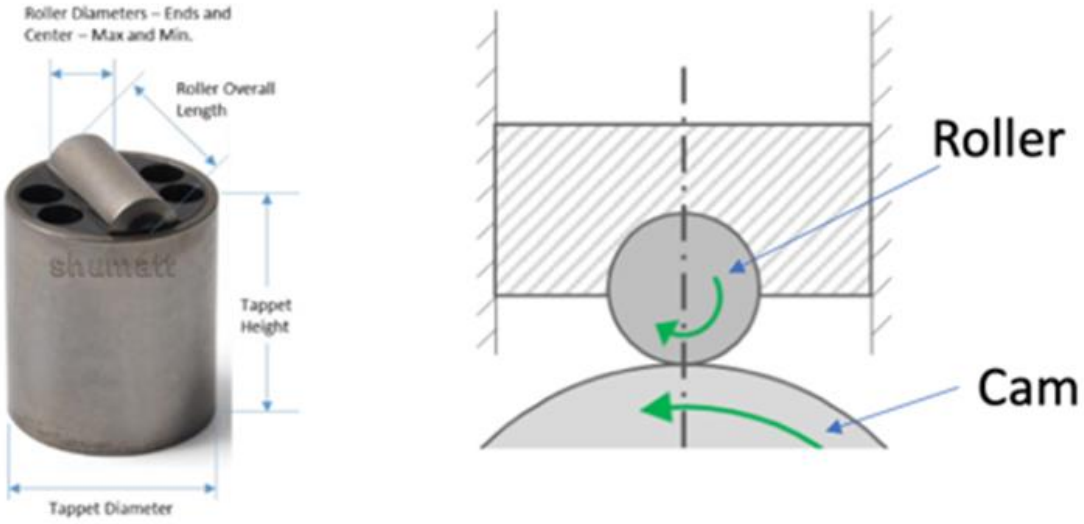


37. Because of its sliding foot contact area and lower stresses, the CP3 is more tolerant of poor fuel quality.

38. The CP4 pump design was a radical departure from the CP3, and it relies on a fragile cam-roller-tappet mechanism which did not exist in the CP3. Instead of the wide plunger foot plates sliding against the wide polygon cam to drive the plungers (as shown in Figure 1 above), the CP4 pump uses a small, 10 mm roller pin (about the size of a AAA battery) as the only source of contact with the

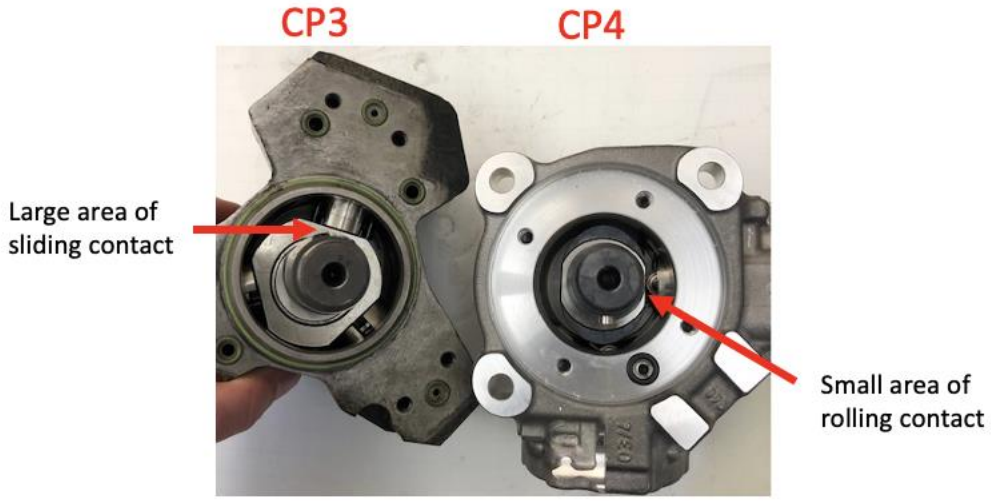
camshaft. With this system, the CP4 system is placing a lot of pressure on the contact point between the roller and the cam. This very small area of contact carries all the forces required to transfer the energy to generate the very high pumping pressures. In addition, since the 10 mm diameter roller is about one quarter the size of the camshaft lobe on which it rotates, the smaller roller must rotate 4 times as fast as the CP4 camshaft. Since the Power Stroke engine drives the CP4 at the same speed as the engine, this means the roller must rotate at 4 times the engine speed, or in the range of 11,200 revolutions per minute (for an engine speed of 2,800 rpm). Below is a schematic of the tappet holding the roller pin, which contacts the cam:

Figure 2: Roller, Camshaft, and Tappet



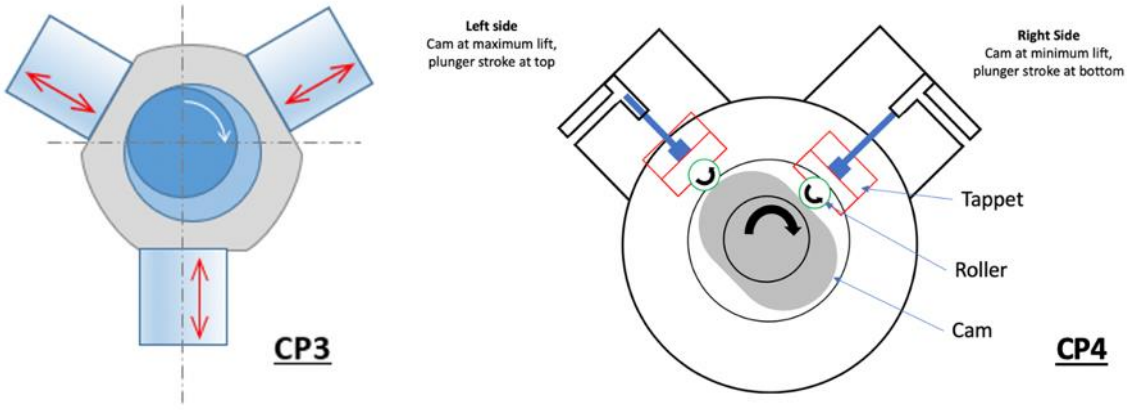
39. Below is a photograph showing a side-by-side comparison of the CP3 and CP4 pumps, which illustrates how the contact area between the CP4's cam and roller is much smaller than the area between the CP3's ring and plunger foot:

Figure 3: Comparison of CP3 and CP4 Pumps



40. The design differences are further illustrated in the graphic below, which again shows the large surface contact area between the polygon and the plunger of the CP3 as compared to the small line contact between the cam and the roller of the CP4:

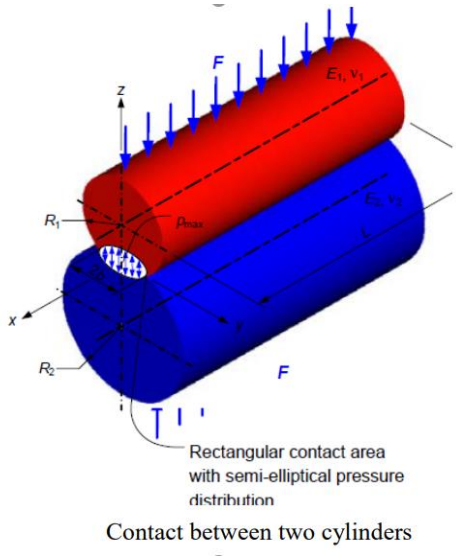
Figure 4: Schematic Comparison of CP3 and CP4 Pumps

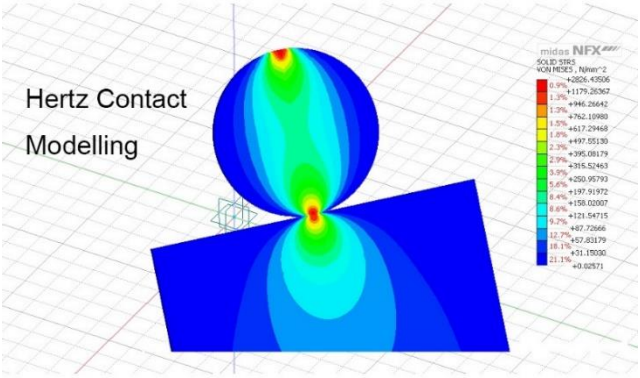


41. The CP3 pump's sliding foot design distributes the load and reduces stresses on the polygon cam follower. It slides back and forth and does not need to roll to create a lubricating fluid film. Conversely, the CP4 cam-roller design results in very high forces along a single line of contact. The friction of the roller in the tappet must be less than the friction on the roller cam interface or else the roller will not rotate (or spin); instead, it will slide. The roller also creates a hydrodynamic lubrication film of fuel between the roller and cam. This film is very thin, on the order of 1 micron or less (1 micron = 40 millionths of an inch). If the roller stops rotating and sticks or slips on the cam, it loses this lubrication film and starts to wear. In real world operating conditions, the result of all these factors is a lack of robustness because of the susceptibility to contamination through metal shavings or other debris, caused in part by metal-on-metal rubbing between the roller pin and the cam.

42. The critical roller pin design of the CP4 creates very high stress (called Hertz stresses) as diagramed below:

Figure 5: Hertz Stresses on CP4 Roller and Cam





43. Comparing relative Hertz stresses of CP3 and CP4, the CP4 roller-to-cam contact Hertz stresses are about two times higher than the CP3. These higher stresses will increase contact fatigue and wear of the metal parts that come in contact with each other. In the case of the CP4, these parts are the roller and camshaft. Accordingly, use of the CP4 pump for the same amount of force would be more likely to wear and fail than the CP3 for the same lubrication conditions of lubricity, viscosity and fuel quality. This would be aggravated and increase wear dramatically if the roller pin stops rotating and starts sliding. Aggressive roller and cam wear changes the roller diameter to more of a slider and generates wear debris.

44. Unlike the CP3 pump, which uses a sliding elephant's foot design to spread stresses and shortened distance of metal-on-metal travel, the CP4's cam-roller design results in very high forces along a single line of contact. The friction of

the roller in the tappet must be less than the friction on the roller cam interface. The result of all these factors is fragility, and susceptibility to contamination through metal shavings or other debris, caused in part by metal-on-metal rubbing between the roller pin and the cam.

45. The CP4 pump was first introduced in Europe in the 2007 timeframe, and criticism of the pump began almost immediately based on its fragile design and its sensitivity to fuel quality. In addition to the design limitations referenced above, the tappet which houses the roller pin is not prevented from rotating around in its own axis inside the cylindrical pump housing. If the tappet does rotate out of position, the roller pin rotates from parallel to the camshaft, to perpendicular to the camshaft. Once rotated the roller will no longer rotate, and instead the cam slides across the roller, leading to wear and erosion, as a trough is being carved into the cam. The wear and erosion will generate metal shavings that are carried by the fuel throughout the fuel system, including downstream to the sensitive high pressure fuel injectors. The photograph below shows the severe wear and gouging caused by rotation of the tappet:[11]

[11] Tomasz Osipowicz, *Testing of Modern Fuel Injection Pumps*, 15 TEKA. COMM'N OF MOTORIZATION AND ENERGETICS IN AGRICULTURE 57-60 (2015), available at http://www.pan-ol.lublin.pl/wydawnictwa/TMot15_1/Osipowicz.pdf.

Figure 6: Wear on the Cam and Roller

46. The second issue is additional wear due to the metal-to-metal surface contact between the cam and roller, and metal-to-metal contact between the roller and roller shoe. This wear inevitably results in the creation of metal filings which can contaminate the fuel system and damage the injectors. The metal-to-metal wear can occur any time the roller stops rotating inside the tappet shoe. Metal particles that lodge inside the roller shoe can effectively jam the rolling pin in a stuck position. In addition, low viscosity caused by water in the fuel can reduce the film layer thickness the roller depends on to ride above the shoe.

47. When particles enter the roller shoe, and if the film of fluid is not thick enough the hard diamond-like coating of the tappet roller shoe can wear off. As the coating wears, damage becomes progressively worse, even as the wearing generates more hard and fine particles that can make their way through the fuel system to the

injectors. Below is a close-up of the CP4 tappet roller shoe, showing abrasive wear of the coating:

Figure 7: Wear on the Diamond Coating

48. Finally, the pump depends upon the fuel to lubricate the roller pin and the camshaft and prevent wear. U.S. diesel fuel (as explained further below) is refined to a less lubricous specification limit as compared to Europe.

49. Small wear particles (small enough to pass through the engine's filters or created downstream of the filters through corrosion or wear) are problematic—and potentially catastrophic—for the CP4 for two reasons. First, if the wear particles come in between the cam and the roller, they can create increased point-contact stresses which can damage the ultra-smooth faces of the components, eventually leading to spalling, cracking or loss of material. Second, if the wear particles lodge between the roller and the roller shoe they can cause the roller to stick. If the roller sticks or stops rolling it can cause the tappet to slide between the cam and the roller

or to rotate out of alignment with the cam. Any of these conditions causes stress, metal fatigue, wear, and ultimately catastrophic failure.

50. "Catastrophic" failure can occur through accumulation of wear when the roller skids on the camshaft and aggressively wears to the point of complete roller and tappet breakdown. Large fragments of the worn parts can crack the fuel pump housing and cause fuel leakage to the engine compartment. Migration of wear particles into the common rail, injectors and engine can cause progressive or sudden damage to the pump, injectors, engine, turbocharger and aftertreatment systems. Engine stall or failure to start can also occur which leads to a "mission disabling" failure and vehicle limping to a repair shop or on the side of the road.

51. Catastrophic failure also occurs when the level of wear is so severe that the pump plunger is not able to complete the full pressurizing stroke and the fuel pressure target is not achieved. If the pump is completely unable to pressurize the fuel the engine will either not start, or, if it is running, the engine will stop. As a result, the vehicle must be towed as it is no longer operable.

52. When a catastrophic CP4 pump failure is confirmed, not only must the pump itself be replaced, the entire high-pressure sub-system consisting of fuel lines, fuel rails, sensors, and injectors must be replaced as well. On the low-pressure side, the fuel tank must be drained and thoroughly cleaned, the fuel lines much be flushed, and the both fuel filters replaced.

53. Even if the pump does not catastrophically fail, small, micron-sized metal filings from the wearing process may enter the high-pressure fuel system. This leads to fuel injector damage, which could impact the precise control of fuel flow. Additional and unwanted excess fuel also leads to a number of problems, including damaging or prematurely aging the pistons, cylinders, turbo charger, or the downstream aftertreatment components.

54. The defective CP4 pump has been the subject of numerous scholarly and analytical industry articles, which describe how the pump can catastrophically fail, as well as how wear in the pump generates metal shavings which can cause injector problems and engine over-fueling. For example, a Polish academic investigator described the problem as follows:

> Fuel injection pump Bosch CP4 is composed of: a drive shaft, a roller in the holder and a plunger pumping section. The most durable component of the tested fuel injection pump tested is its plunger pumping section. The roller with its holder is in the pump body. *A defect of this component is lack of stabilization, which causes that the whole roller can rotate 360° in the pump body*.
>
> If the roller starts rotating around its own axis during the pump operation, it is no longer possible for it to return to its original position. Then, it starts destroying a cam on the pump drive shaft. As a result of friction on a cam and a roller, metal filings are generated, fouling and destroying the whole fuel supply system.[12]

[12] Osipowicz, *supra* note 10.

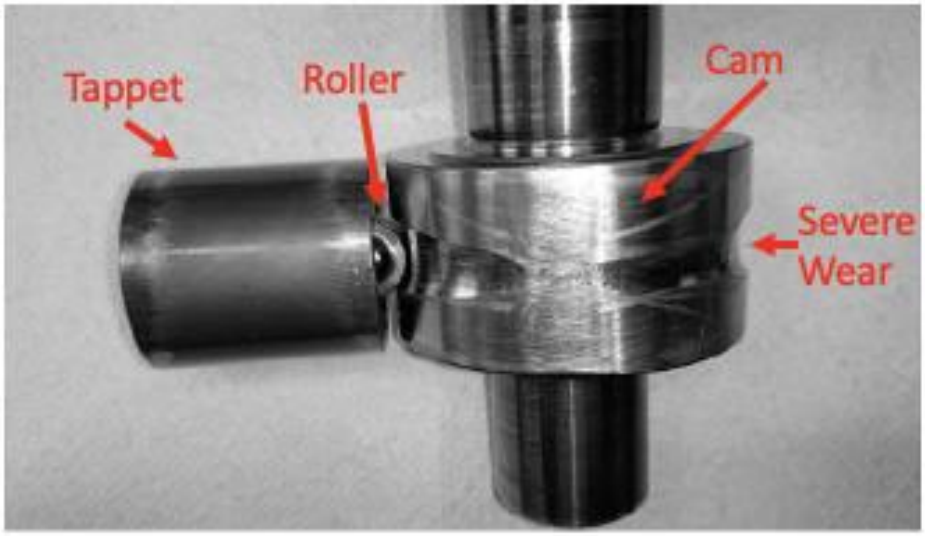
55. A second report, presented to the International Congress on Combustion Engines, stated as follows:

> An improper cam-roller-pusher solution is a **fundamental flaw** of this generation of [CP4] pumps. The applied roller significantly contributed to reducing forces in the mechanism by utilizing rolling friction, however the pusher with a circular cross-section had a tendency to rotate, particularly when contaminants were present, friction was elevated by inferior fuel quality or insufficient fuel quantity. When the roller's position changes to perpendicular relative to the shafts' axis, rolling friction changes to sliding friction, which exponentially accelerates the mechanism's wear. Metal filings from the damaged roller destroy inter-operating element of the pumping section, and cause seizing when they penetrate into injectors.[13]

56. The figure below from one of the academic reports shows the orientation of a rotated tappet and the damage that occurs when the roller rotates on its axis, causing the cam to slide across the roller, rather than rolling together with it:

[13] Mateusz Bor, et al., *Analysis of Hypocycloid Drive Application in a High-Pressure Fuel Pump*, 118 MATEC WEB OF CONFERENCES: VII INTERNATIONAL CONGRESS ON COMBUSTION ENGINES, 00020 (2017), available at https://www.matec-conferences.org/articles/matecconf/pdf/2017/32/matecconf_icce2017_00020.pdf (emphasis added).

Figure 8: Effects of Rotation of the Roller



57. These same academics summarized the problem as one of design that is highly sensitive to the quality of fuel:

> Due to the high precision of injection process control, with high pressure or fuel compression, these systems are characterized by sensitively to the quality of applied fuel due to the large faces acting on the system's elements. Numerous design solutions are susceptible to damage resulting from defective design of a given element, beside damage generated by fuel of insufficient quality. In the case of pump defects, leading to the creation of filings with diameters below several micrometers, other elements of the injection systems are also damaged very frequently, which increase repair costs significantly.[14]

[14] *Id.*

58. As Diesel Tech Magazine, an industry publication, aptly explained in its December 2017 article entitled, "Common Problems: the CP4 Time Bomb:"[15]

> It's always frustrating to finally get your hands on a brand-new truck (or at least, new to you) and find out there's something wrong with it. It's even more frustrating to learn that not only are you not alone in your suffering, but that it's a common problem to your vehicle. . . . To kick things off, we're going to look at something that's very near and dear to our hearts: the CP4 injection pump. . . . Boy, where to begin? People have taken a somewhat hyperbolic approach and refer to the CP4 as a time bomb, among other colorful terms. The thing is, they're not too far from the truth. Even if you have a 100 percent stock pickup, there's a *really* good chance that you're going to be on the receiving end of a $10,000 bill when it finally goes out on you and destroys your entire fuel system.

D. Characteristics of U.S. diesel fuel

59. As the foregoing suggests, the properties and quality of diesel fuel are very important. Key fuel properties such as minimum levels of lubricity and viscosity must be met at all times throughout the life of the engine in order to at least partially mitigate the damage from the defective pump.

60. The CP4 relies on diesel fuel itself to maintain lubrication. The lubricity of diesel in Europe is more standardized than American diesel, but European diesel is also dirtier. Because the sulfur in diesel exhaust is a major cause

[15] *See* Trevor Mason, Common Problems: The CP4 Time Bomb, DIESEL TECH (Dec, 2017), https://www.dieseltechmag.com/2017/12/common-problems-the-cp4-time.

of smog and acid rain, in 2007, the EPA required diesel fuel sold in the U.S. to have less than 15 ppm of sulfur. This is known as Ultra Low Sulfur Diesel ("ULSD"). It is produced through a refinery process known as hydrodesulfurization ("HDS"). Sulfur provides some of the lubricity needed for the pump to operate. But the refinery process required to produce low sulfur diesel destroys a variety of important nitrogen- and oxygen-based polar and organic compounds that give diesel fuel its lubricity. Indeed, ULSD fuel is considered to be very "dry" and incapable of lubricating vital diesel fuel delivery components, specifically high-pressure fuel pumps and injectors; as a result, American diesel accelerates the breakdown and wear of the pump, and the fuel injection system components "are at risk of premature and even catastrophic failure when ULSD fuel is introduced to the system."[16]

61. Low sulfur diesel fuel first appeared in American markets in the 1990s, with fewer than 500 ppm of sulfur. It is estimated that 65 million fuel injection pumps failed as a result. It was thought that the pumps failed at the equivalent of 100 to 200 hours of operation. Thus, the critical importance of lubricity for diesel injection pumps was well known to all auto manufacturers for a decade or more before the Class Vehicles were designed or introduced into the market.

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[16] Arlen Spicer, *Diesel Fuel Lubricity Additives: Study Results*, THE DIESEL PLACE, Aug. 26, 2007, available at http://www.jatonkam35s.com/DeuceTechnicalManuals/Diesel_fuel_additive_test.pdf.

62. The main body that sets standards for diesel fuel is the ASTM;[17] the specific standard for U.S. diesel fuel is known as the ASTM-D975, which has been adopted by the EPA as a binding regulation.[18] Lubricity in diesel fuel is quantified as measurement of wear. A test method called a high frequency reciprocating rig (HFRR) involves oscillating a weighted ball across a flat plate and measuring the scratches or "wear scar" pattern on the surface. The diameter of the wear scar is thus an indicator of lubricity, with larger diameters indicating low (poor) lubricity fuel and smaller diameters indicating high (better) lubricity fuels.

63. In the U.S., the minimum HFRR wear scar diameter is 520 µm, compared to the European standard of 460 wear scar. Since the CP4 pump is self-lubricating with the diesel fuel it is pumping, the lack of lubricity of U.S. diesel significantly diminishes the pump's durability and longevity, particularly when fuel is even partially contaminated (which invariably occurs in real-world driving). And since the lubricity of the diesel fuel is an important factor in the durability of the pump, careful attention should have been paid to the difference in U.S. and European fuels.

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[17] "ASTM" previously stood for the American Society for Testing and Materials. Now, however, the ASTM standards are negotiated and implemented worldwide. The governing body is currently known as ASTM International.

[18] 40 C.F.R. § 80.1468.

64. Engine manufacturers were well aware of the foreseeable mismatch between engine part specifications that require a maximum of 460 wear scar, and the lower lubricity specifications of Ultra Low Sulphur American diesel fuel:

> Lubricity describes the ability of a fluid to minimize friction between, and damage to, surfaces relative to motion under loaded conditions. Diesel fuel injection equipment relies on the lubricating properties of fuel. Shortened life of engine components such as fuel injection pumps and unit injectors can usually be attributed to lack of fuel lubricity and, hence, lubricity is of concern to engine manufacturers. This property is not addressed adequately by ASTM D 975.[19]

Ford Motor Company is a member of the EMA. [20]

65. Further, the EMA made clear:

> Regardless of the fuel sulfur level, ASTM D975 currently requires lubricity specified as a maximum wear scar diameter of 520 micrometers using the HFRR test method (ASTM D6079) at a temperature of 60°C. Based on testing conducted on ULSD fuels, however, fuel injection equipment manufacturers have required that ULSD fuels have a maximum wear scar diameter of 460 micrometers. EMA recommends that the lubricity specification be

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[19] *EMA Consensus Position: Joint EMA/TMC Pump Grad Specification for Premium Diesel Fuel*, TruckAndEngineManufacturers.org (Apr. 22, 2002), available at http://www.truckandenginemanufacturers.org/file.asp?A=Y&F=20020422+EMA+Consensus+Position+Pump+Grade+Specification%2Epdf&N=20020422+EMA+Consensus+Position+Pump+Grade+Specification%2Epdf&C=documents.

[20] *See* EMA, *supra* note 2.

> consistent with the fuel injection equipment manufacturers' recommendation.

8/8/2005 Engine Manufacturers Association, Position Paper entitled "North American Ultra Low Sulfur Diesel Fuel Properties."[21]

66. In a September 2009, Common Position Statement published by the Joint Diesel Fuel Injection Equipment Manufacturers ("Joint FIE Manufacturers") regarding Fuel Requirements for Diesel Fuel Injection Systems," the Joint FIE Manufacturers expressed the following comments to their colleagues in the automotive industry:

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[21] U.S. automotive industry-wide knowledge of the need to manufacture vehicles with equipment capable of handling the U.S.'s low-lubricity diesel fuel many years before the manufacture of the vehicles at issue here corroborates Ford's knowledge of the problem from the company's very inception. *See, e.g.*, Order on Def.'s Mot. Dismiss at 12, *Click v. Gen. Motors LLC*, No. 2:18-cv-00455 (S.D. Tex. Mar. 27, 2020), ECF No. 83 ("GM complains that it cannot be charged with knowledge about the CP4 fuel pump before it actually began incorporating those fuel pumps into its vehicles . . . . But that assumes, contrary to product development and industry standards, that a manufacturer has no responsibility to research and test products prior to manufacturing them." (citations omitted)); *In re Gen. Motors LLC CP4 Fuel Pump Litig.*, 393 F. Supp. 3d 871, 879 (N.D. Cal. 2019) (upholding Plaintiffs' CP4-defect-based fraudulent concealment claims against GM based on the following allegations which largely mirror the allegations here: "Plaintiffs allege that GM became aware of the need to install equipment capable of handling low lubricity diesel fuel many years before manufacturing the vehicles at issue here, because the entire automotive industry had 'experience[d] . . . widespread catastrophic fuel injection pump failures when cleaner diesel standards were first implemented in the 1990s.' When low-sulfur diesel 'first appeared in the American market in the 1990's,' an 'estimated . . . 65 million fuel injection pumps failed as a result.'" (citation omitted)).

> The continuous world-wide tendency to increase engine performance and reduce emissions has necessitated the development of new generations of enhanced diesel fuel injection equipment, supporting the achievement of stringent legislation targets. Rising injection pressures and multiple injections result in higher operating temperatures, increased contract pressures and reduced clearances . . . . Alterations to fuel quality, e.g., by increasingly severe refinery hydroprocessing being introduced to remove Sulphur also reduce the content of aromatics and destroy surface active compounds and antioxidants. ***Removal of these beneficial compounds effects boundary lubrication, commonly known as lubricity, and inherent oxidation stability and must be compensated for.*** Fuel parameters such as cetane number, viscosity, density, lubricity, oxidation stability, sulfur and aroma content, together with the absence of free water and dirt contamination, are key parameters required to ensure performance of equipment in the field.
>
> Biofuels are becoming increasingly available to end-users [including] in the United States of America . . . . It must be recognized that the physical and chemical characteristics of bio components are significantly different to conventional fuels and that care must be taken in their specification and use.
>
> Diesel fuel injection equipment (FIE) manufacturers fully support the development of alternative sources of fuel . . . . ***However, many vehicles, engines and equipment are not designed to run on them. It is recommended to refer to the vehicle and engine manufacturers 'Limitations of Use' documents for guidance.***[22]

[22] Joint FIE Manufacturers, *Fuel Requirements for Diesel Fuel Injection Systems: Diesel Fuel Injection Equipment Manufacturers: Common Position Statement 2009* (Sept. 2009), available at https://advancedbiofuelsusa.info/fuel-requirements-

67. Likewise, in a July 2014 study on the use of fuel injection equipment with global diesel fuels, Parker Racor, the leading global supplier of diesel fuel filtration systems, explained the following:

> The increase in system pressures in diesel engines has a significant effect on filtration requirements. These systems are highly vulnerable to many forms of contaminants and the need for robust high efficiency filtration has never been higher . . . . An analysis of global diesel fuel quality shows that although the fuel quality in the developed markets has improved, significant quality concerns still remain. Levels of water and contaminants remain at levels that can cause long term issues to the latest fuel injection systems. Specifically, the levels of contaminants smaller than 5 microns remain very high. These particles can be small enough to pass into the internal clearances of high pressure fuel injection systems and can lead to erosion and wear of critical areas leading to a loss in system performance and eventually system malfunction. Diesel filtration balances pressure drop, useful life and efficiency. ***However the real long term effect on fuel system life is often not adequately considered[,] as much of the engine durability testing performed is done using high quality fuel that doesn't represent the range of fuels seen in the market***. Consideration of filtration performance under less than ideal conditions is necessary to develop an acceptable level of protection.[23]

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for-diesel-fuel-injection-systems-diesel-fuel-injection-equipment-manufacturers-common-position-statement-2009/ (emphasis added).

[23] Steven Hardison & Adam Pearce, *July 2014 Summary of Fuel Injection Equipment with Respect to Diesel Fuel Filtration* at *i*, PARKER RACOR & AVL (Jan. 7, 2015), available at https://www.parker.com/literature/Racor/RSL0194%20Rev%20-%20(TAP_AVL-Fuel-Study-Racor).pdf; *see also id.* at 13 ("Careful

68. Most diesel fuel in the United States is produced by distillation of petroleum oil in a refinery. The fuel is refined and processed to meet certain specifications outlined in regulations and guidelines adopted by the EPA. The refinery also blends additives into the fuel to meet the applicable specifications. Once U.S. diesel fuel is produced in the refinery it enters a distribution system where it travels to terminals and then ultimately to a fuel pumping station. In the U.S., fuel may be transported in a variety of ways included pipelines, trucks, and rail. The figure below is a schematic showing the flow of fuel from its source (crude oil) through refining and distribution:

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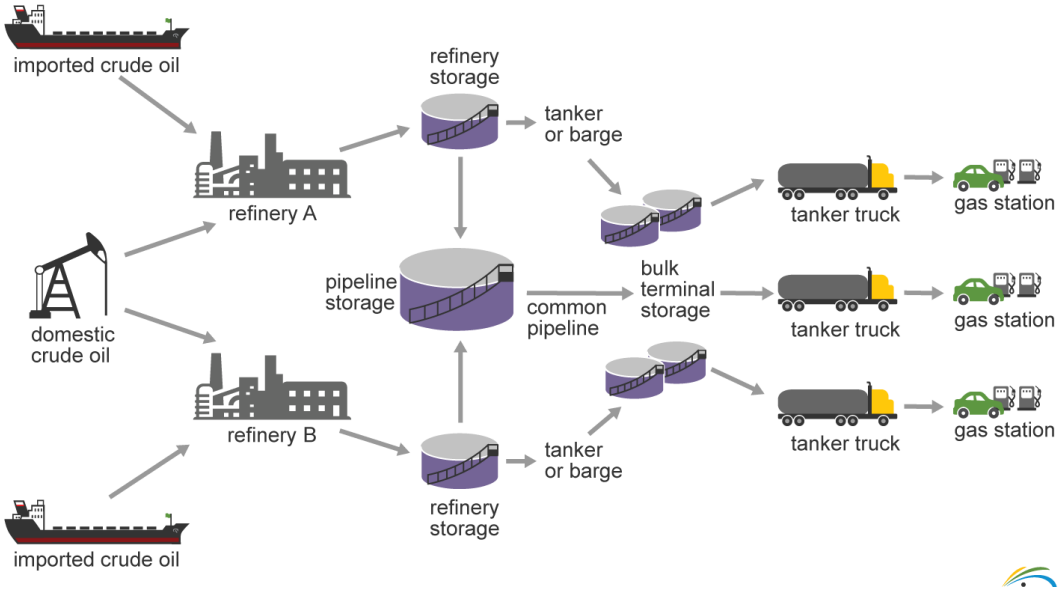
monitoring of fuel quality and filter performance is needed to protect sensitive diesel engine injection systems"); *id.* at 29 ("To avoid costly engine and fuel system components damages, advanced multi-stage filtration is recommended"); *id.* at 31 ("Modern high pressure diesel fuel injection systems contain very small internal clearances and are vulnerable to any build-up of deposits on these components . . . . This issue has become a significant concern in the industry").

Figure 9: Transport of Fuel from Source to Gas Station



69. Fuel is tested to ensure it meets ASTM specifications once it leaves the refinery and again when it leaves the bulk terminal. Fuel may be blended (with biodiesel for example) or enhanced with various additives at either the refinery or the terminal. Although there is a system in place to try to achieve uniformity of fuel quality, as described below, in practice there are a number of factors that lead to the frequent production of substandard quality fuel.

E. The unreliability of U.S. diesel fuel

70. Despite EPA requirements, in reality, U.S. diesel frequently contains even less than 15 ppm, a truth that is widely known within the U.S. automotive industry.

71. Notably, according to Infineum's[24] 2014 Worldwide Winter Diesel Fuel Quality Survey testing of 341 diesel fuel samples from around the world, all diesel fuel samples the organization collected and tested from the U.S. and Canada contained sulfur levels of 10 ppm or less.[25]

72. Other fuel surveys indicate that U.S. diesel scar differs drastically across the continental U.S. For example, in 2018 Infineum conducted a survey of the lubricity of U.S. diesel fuel from various regions of the continental U.S. and found the following:

[24] Infineum is a company that is globally recognized as the leader in diesel fuel quality surveys.

[25] *Infineum Worldwide Winter Diesel Fuel Quality Survey 2014*, INFINEUM INT'L LTD., available at https://www.infineum.com/media/80722/wdfs-2014-full-screen.pdf (last accessed Oct. 31, 2019), at 6-7.

Table 1: Survey of Lubricity of U.S. diesel fuel (2018)[26]

	Minimum lubricity scar score	Maximum lubricity scar score	Mean	Sample size	Locations exceeding 520 wear scar	Locations exceeding 460 wear scar	Locations exceeding 400 wear scar
East Coast	219	506	385	10	0	1	5
Midwest	198	526	390	37	1	9	24
West Coast	289	526	448	10	1	6	7
Total				57	2	16	36

73. Based on this chart, it is clear that there are certain locations where the fuel's lubricity will further accelerate the breakdown and wear of the pump. Over the course of a truck's lifetime, a truck driver will likely use diesel fuel that is "dry," which will accelerate the damage to the engine outlined herein.

74. However, with the advent of ULSD fuel, high lubricity fuels are hard to obtain and the consumer has no way of knowing the lubricity of the fuel at a standard retail filling station. To that extent, the numbers listed in Table 1 are troubling: nearly two thirds of all diesel fuel stations sell diesel fuel that exceeds the maximum lubricity score that Bosch indicated was "strongly recommended." About

[26] *See Infineum Worldwide Winter Diesel Fuel Quality Survey 2018*, INFINEUM INT'L LTD., available at https://www.infineuminsight.com/media/2228/infineum-wdfqs-2018-v10-14112018.pdf (last accessed Dec. 2, 2022).

3 in 10 diesel fuel stations exceed European standards. Based on this data, it seems all but inevitable that truck owners will eventually fill up their trucks with diesel fuel that is "dry" and harmful to the trucks' engines.

F. Water and contamination in U.S. diesel fuel

75. U.S. diesel fuel can also easily degrade and move off specification during transportation and storage, including from the entry of water into the fuel.[27] Water can seep into the fuel supply, which decreases the fuel's viscosity.[28] During transfer of fuel—either from refinery to storage tanker, or from tanker to the pump—air can get into the fuel. When the air cools, water condenses and drops into the tank. If this occurs, the fuel loses viscosity, which has a directly negative effect on its lubricity, resulting in an insufficient layer of protection between the roller pin and the tappet shoe.

76. The potential for water to get into the fuel supply is a well-known and easily anticipatable problem for OEMs such as Ford. Diesel fuel tanks "breathe"

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[27] Rick Chapman, *Why Fuel Quality Standards are Important, STI Webinar – Petroleum Storage Tank Maintenance*, INNOSPEC (Dec. 18, 2013), available at https://www.steeltank.com/Portals/0/Shop%20Fab/12.18.13STI%20webinar%20Fuel%20Specs%20FINAL.pdf.

[28] Viscosity is a measure of the thickness of a liquid, which can affect the lubricity. Generally, a viscous liquid is more lubricious, although there are many exceptions: corn syrup is viscous but not lubricious; cooking spray is not viscous but is lubricious.

through filler caps and vents, and as fuel is withdrawn by the fuel pump, humid air can enter the fuel tank and water can condense when the fuel tank cools.

77. Diesel fuel can become contaminated by dirt or corrosion particles. Fuel tanks can become rusty through exposure to air. The net result of contamination is the particles clog up the two filters in the fuel injection system.

G. Pre-class period failures and industry knowledge

78. The Bosch CP4 fuel injection pump was defective and particularly incompatible with U.S. diesel fuel from the very beginning, even prior to its usage in the Class Vehicles. For example, on February 7, 2011, the National Highway Traffic Safety Administration's ("NHTSA") Office of Defects Investigation ("ODI") opened a safety investigation based on 160 complaints "alleging incidents of engine stall and/or loss of power that appear to be related to high pressure fuel pump ('HPFP') failures in certain model year (MY) 2009 through 2010 Volkswagen Jetta and MY 2010 Volkswagen Gold and Audi A3 vehicles equipped with [turbo diesel engine] clean diesel engines. Approximately half of the reports indicate that the failure resulted in an engine stall incident, with many of these alleging stall incidents at highway speeds in traffic with no restart." During this investigation, ODI requested documents not only from Volkswagen and Bosch, but also from GM, Ford, and FCA. Documents that the OEMs produced were subsequently published on NHTSA's website.

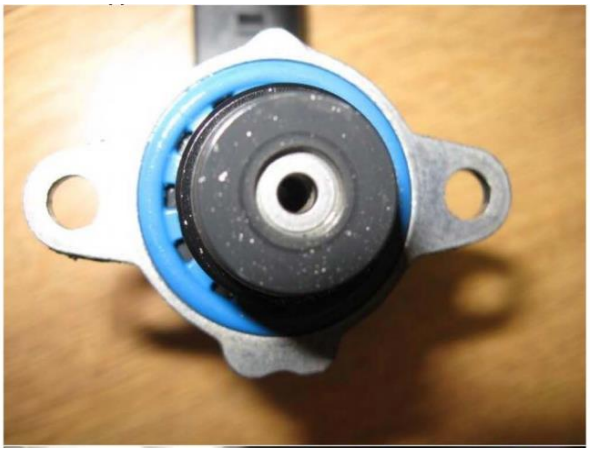
79. These documents demonstrate widespread and early knowledge of the defect and its potentially catastrophic effects. Some of the disclosures from these documents is provided below.

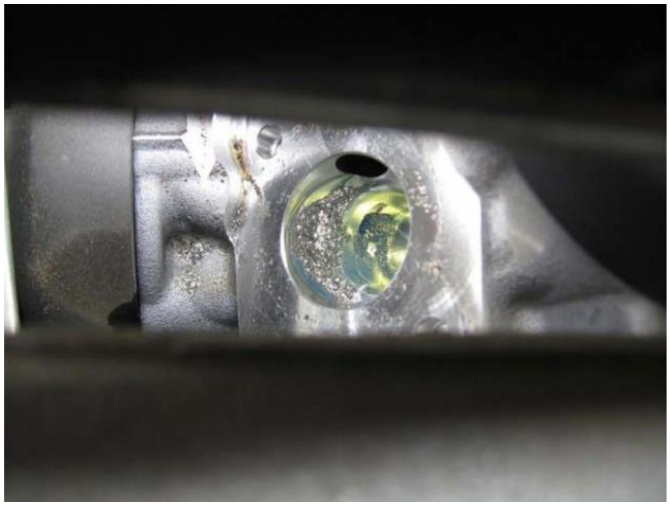
80. In September 2009, Bosch, at the time supplying the defective CP4 fuel pump to Audi and Volkswagen, received a notice from Audi about a "3rd HPP failure" in the U.S., explaining, "I'm afraid there's bad news from the U.S.: After 2 failures in the field … the 3rd HPP failure has now occurred in the EC endurance run."[29] Photos attached to the email show the failed Bosch CP4 fuel pump, replete with metal shavings in the gasket:[30]

[29] Sept. 2, 2009, email from Audi representative to Bosch representatives regarding "3rd HPP Failure USA" at 146, produced in response to NHTSA Inquiry EA11003EN-00639[0], available at https://static.nhtsa.gov/odi/inv/2011/INRD-EA11003-59428P.PDF.

[30] *Id.* at 148-50.

Figures 11-13: CP4 Pump with Shavings





81. In August 2009, Audi sent Bosch a failed CP4 fuel pump for analysis after "[t]he high pressure fuel pump failed catastrophically shedding metal shavings throughout the entire fuel system . . . . This car will require a complete new fuel system from tank to injectors and everything in between. This will be a very lengthy repair (weeks) . . . . We need to determine if component failure or bad fuel is to

blame."[31] Thereafter, on September 1, 2009, Bosch responded to Audi with the following analysis note from their failed pump inspection: "Gentleman, [t]he pump mentioned below was analyzed. The result of the finding is sand-like particles in the fuel. ***Defect caused by customer.***"[32]

82. In May 2010, after analyzing foreign particles found in the fuel filter of a failed Audi diesel engine equipped with a CP4 fuel pump and determining that the

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[31] March 7, 2011 Bosch submission to NHTSA in response to Inquiry No. INRD_EA11003, document entitled, "INRD_EA11003-59347P.pdf," at 35.

[32] *Id.* at 38 (emphasis added); *see also id.* at 21 (Mar. 31, 2008 email from Volkswagen to Bosch re: "Radio: Drivetrain damage failure US07 (Jetta)," in which the parties are discussing an HPFP failure in a 2007 Jetta and the Volkswagen representative states, "Can you (panel of experts) explain to us how the failure mechanism was after this mileage? . . . . We will certainly not accept a failure because of fuel quality! . . . . We also see a big risk here for our BIN5 pump, which has to manage with the same fuel in USA"); May 2012 Bosch submission to NHTSA in response to Inquiry No. INRD-EA11003, document entitled, "INRD-EA11003-59334P.pdf," at 9-10 (July 4, 2008 email from Audi to Bosch re: "CP4 BIN5 3rd and 4th failure in USA," analyzing root cause of CP4 field failures and positing, "Why is it that EC pumps do not fail? Because of a different fuel?"); *id.* at 13-14 (July 11, 2008 email between Audi and Bosch representatives re: "W19 BIN5 pump failure" in which Audi writes, "For the zero error meeting in FeP on Tuesday we expect the information discussed at the error meeting on endurance testing of fuels with 'poor lubricity, containing water etc.' and all failures, drivetrain damage in all component, system and other endurance runs of Bosch and all customers"); July 27, 2012 Bosch submission to NHTSA in response to Inquiry No. INRD-EA11003, document entitled, "INRD-EA11003-59345P.pdf," at 7 (emphasis added) (June 30, 2009 email between Bosch and Audi representatives re: "ANS: HPP measures/ USE," in which the Audi representative writes, "I don't think you're reading my mails anymore! Please look at the failure curves specifically, then you'll see that ***we only have a problem in certain markets[.] . . . Depending on how poor the fuel currently on the market is***"); *id.* ("I'd prefer to have a more robust pump").

biodiesel used in the subject engine was "insufficient[ly] cleans[ed]" resulting in deposit formation "which is not conducive to establishing the lubricating film in the [fuel pump] roller support," Bosch noted that, "When [diesel fuel] viscosity is too low, the lubricating film is not established properly and mixed friction and surface contact occurs = bad."[33]

83. In a June 2010 email chain between Bosch and representatives of Audi and Volkswagen regarding the catastrophic failure of a CP4 pump in a 2010 Audi A3 TDI diesel vehicle (published on NHTSA's website), Audi asked Bosch, "[W]hy are the defects mentioned below still present after replacing the high-pressure pump and the injector? What could the [dealer] have done wrong by way of incorrect repair so that such defects are appearing?" Bosch responded that "In this case the complete fuel system (HPP, rail, injectors, all lines) need to be changed . . . . I assume that because of the 'cruncher,' the entire system is contaminated with chips, which are then pumped in circulation and can soon lead to the next failure! The rough running

[33] July 27, 2012 Bosch submission to NHTSA in response to Inquiry No. INRD-EA11003, document entitled, "INRD-EA11003-59345P.pdf," at 12–14 (May 26, 2010 email chain between Audi and Bosch representatives re: "Particle analyses, fuel filter").

can be explained by the fact that a chip is already present before or in the injector and is impairing its function."[34]

84. In June 2011, Bosch received a report from Volkswagen regarding a CP4 pump failure in a 2.0L Volkswagen TDI in which the Volkswagen representative explained, "I have here a pump from [sic] a 2.0L TDI. I have been testing a lot of these this week and many have an amount of 'metal Debris' or other metallic particles in them."[35]

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[34] *See*, *e.g.*, July 7, 2008 email between Audi and Bosch representatives re: "Performance drop AU716 98017 with shavings in the HPP," discussing how "[s]omething is disintegrating" in the Audi 716 fuel pump and that "[w]e are a bit speechless" about "[t]he shavings, or whatever it is"), submitted as part of Bosch's May 2012 responses to NHTSA ODI Inquiry No. INRD-EA11003, document entitled, "INRD-EA11003-59334P.pdf," at 6; *id.* at 27 (July 31, 2008 email from Audi representative re: "Fuel quality in [**REDACTED**]," stating that, "With our [Audi's] V6TDI with the high-pressure pump CP4.2 we have significantly higher failure rates in [**REDACTED**] (higher by a factor of approx. 30 than the average of all markets) . . . . Have you any information suggesting that such a thing could be possible with this country-specific diesel fuel?"); *id.* at 28-31 (Feb.-May 2011 email chain between Audi, Volkswagen and Bosch representatives re: "Status CP4 USA," in which the parties discuss the substantial increase in warranty claims with the implementation of the CP4 in vehicles in the U.S. market).

[35] Mar. 7, 2011 Bosch submission to NHTSA in response to Inquiry No. INRD-EA11003, document entitled, "INRD-EA11003-59347P.pdf," at 12 (June 9, 2011 email from Volkswagen Group of America, Inc. to Bosch re: "2.0L TDI Fuel Pump").

85. By the end of 2011, it was well known that Bosch CP4 failures in U.S. Audi and Volkswagen vehicles were widespread and catastrophic.[36]

86. Although many of the communications cited above in the NHTSA investigation involved Bosch and Audi or Volkswagen, Ford engineers almost certainly would have heard about these problems early on. Vehicle manufacturers such as GM, FCA, and Ford, and component manufacturers such as Bosch, Delphi, and Cummins, have significant and dedicated departments which continuously monitor regulatory compliance with safety, emissions, customs, and tax laws. Their marketing departments monitor their competitors and public domain information to track emerging trends which may impact their business, such as the release of new competitive products or problems with commonly used components on other manufacturer's products. These departments maintain extensive databases of

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[36] *See* July 27, 2012 Bosch submission to NHTSA in response to Inquiry No. INRD-EA11003, document entitled, "INRD-EA11003-59345P.pdf," at 69 (Sept. 15, 2011 email from Volkswagen to Bosch: "***I think the [CP4] failures are well known***. It is also important to know that not only the high-pressure fuel pump, but the entire injection system is to be replaced in case of damage to a HPP with a cost >[**REDACTED**] caused by chip contamination") (emphasis added); *see also* Mar. 22, 2011, email from Bosch employee to Volkswagen employees regarding analysis of failing CP4 fuel pumps at 11, produced in response to NHTSA Inquiry EA11003EN-00639[0], available at https://static.nhtsa.gov/odi/inv/2011/INRD-EA11003-59428P.PDF (showing that, by March 2011, Bosch was continuing to receive "a respectable number" of CP4 "mechanical breakdowns" in the U.S.); *id.* at 19-22 (spreadsheet showing results of Bosch's pre-analysis of HPFP failures in Volkswagen/Audi vehicles where "metal chips found in fuel system").

competitive information including design details, teardown analyses and reverse engineering to maintain their competitive edge or comparative advantage. These databases are searchable by employees and information is pushed to new product development teams.

87. Specific departments in OEMs (including Product Compliance, Liability, and Environmental Management) will monitor many public (and subscription) sites such as truckandenginemanufacturers.org, NHTSA.gov, EPA.gov, the California Air Resources Board (ww2.arb.ca.gov), and international agencies (*e.g.*, www.cen.eu, ASTM.org) to ensure compliance with all standards, regulations and awareness of changing regulations, recalls, and safety-related issues, among others. They will also subscribe or fund firms to do this analysis and information gathering for them. They also employ lobbyists in government agencies to keep abreast of new situations. These firms are all well informed about market conditions and product liability potential issues.

88. In addition, the federal Safety Act and related regulations require the quarterly submission to NHTSA of "early warning reporting" data, including claims relating to property damage received by the automotive manufacturer, warranty claims paid by the automotive manufacturer, consumer complaints, incidents involving injury or death, and field reports prepared by the automotive manufacturer's employees or representatives concerning failure, malfunction, lack

of durability, or other performance issues.[37]

89. Emerging problems (such as the NHTSA investigation of Volkswagen/Audi CP4 pump failures) would certainly be tracked by Ford and other OEMs. There are federal regulatory requirements mandating such tracking. Relevant information would then be condensed and pushed to design, development, testing, service and quality departments to ensure that they were aware of these emerging problems. These global firms maintain extensive bodies of knowledge such as "lessons learned" or "engineering standard work" databases to ensure that problems encountered internally or externally are codified into their own standards and disseminated to working levels of engineering, design, quality and service. "Lessons learned" from competitors are invaluable since they avoid similar problems during development and production. These "lessons learned" databases are particularly important when OEMs develop global products at multiple engineering centers around the world. "Lessons learned" and competitive benchmarking are key steps in the Design Validation Planning of all major OEMs and part of their "Value Analysis" studies for New Product Introduction.

90. In addition, working level engineers and designers also are encouraged to join trade organizations such as the Society of Automotive Engineers, American

[37] 49 U.S.C. § 30166(m)(3); 49 C.F.R. § 579.21.

Society of Mechanical Engineers, and ASTM, and to subscribe to many trade publications and tradeshows to stay current with changing requirements and competitive information. When a new product, regulation, standard, or issue is being announced or rumored, all major automotive news organizations will investigate and report on these developments since they are crucial for the OEMs' business. Product problems are also tracked closely since they affect stock market valuations and warranty accruals in SEC filings.

91. Government organizations such as NHTSA, EPA, and CARB routinely push information to OEMs and require responses to ensure that they are on notice of emerging safety issues, recalls, emissions and safety compliance changes. This information is required to be published broadly by OEMs within their internal websites to employees to put them on notice, and there are compliance audits to ensure that employees are trained and certified where necessary.

92. NTHSA recalls and investigations would certainly be communicated to the product development, quality, purchasing, and service teams.

93. Accordingly, information about the CP4 pump's problems would have been widely known throughout the industry, and certainly known to Ford.

94. Ford acknowledged in its January 20, 2012, response to NHTSA's investigation of high-pressure fuel pump failures that "Inadequate lubricity can result in increased tailpipe emissions, excessive pump wear and, in some cases,

catastrophic failure."[38] According to Ford's corporate representative, Ford's acknowledgement to NHTSA regarding inadequate lubricity was only a year after the class vehicles began to be sold and would only have been driven 5,000-25,000 miles.[39] In other words, the CP4 pump began to fail right away.

95. Importantly, the field data Ford itself submitted to NHTSA in January 2012 was already sufficient to detect a serious defect involving Class Vehicles' fuel pumps. Among other things, Ford submitted records of more than one hundred 2011 MY F-Series diesel trucks which experienced engine destruction due to the defective CP4 fuel pump—many of which Ford identified as "Root Cause: Poor lubricity Fuel."[40] Ford was aware of the field reports of high-pressure fuel pump failure in at least the 2011 model year F-Series, many of which involved moving stalls.

96. A major quality control measure used by Ford and other automotive manufacturers is to compare a particular model year vehicle's warranty claims and other aggregate information (such as driver complaints and field reports) with the preceding model year vehicle's data to evaluate whether there is a measurable uptick

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[38] Jan. 20, 2012, Ford Response to NHTSA Inquiry EA11-003, Document titled, "INRD-EA11003-50102P.pdf," at 19, available at https://static.nhtsa.gov/odi/inv/2011/INRL-EA11003-50102P.pdf.

[39] Fulton Dep. at 178:6-22.

[40] Jan. 20, 2012, Ford Response to NHTSA Inquiry EA11-003, Document titled "INRD-EA11003-50103P.pdf" at Appendix O, pp. 502-547, available at https://static.nhtsa.gov/odi/inv/2011/INRD-EA11003-50103P.pdf.

in the failure rate. In modern day vehicle production, failures are typically measured per thousand vehicles or sometimes even per hundred thousand vehicles, and defect trends are frequently identified after just one or several reported failures.

97. In addition, for many decades, Ford has conducted durability and reliability testing of its new vehicles before introducing them to the market. This means that Ford trucks, including Class Vehicles, are supposed to be exposed to lengthy and comprehensive physical testing that reveals how the vehicles and component parts (including the engines and fuel pumps) will last when driven for tens of thousands of miles.

98. Through this testing, Ford also would have discovered the defect—before selling the first Class Vehicle. As the driver complaints to NHTSA show, it is not uncommon for the Class Vehicles' fuel pumps to fail before the vehicle has even been driven 50,000 miles. Likewise, it is not uncommon for the Class Vehicle fuel pump to fail within the first year or two of driving. These early failures are well within the scope of Ford's durability and reliability testing.

99. Ford should have performed more tests for the Class Vehicles using a wide range of fuel. As detailed herein, the lubricity of fuel in real-world conditions varies dramatically in the United States, suggesting it is prudent for vehicles manufacturer to consider worst-case and realistic-case conditions during testing. As a report from Parker Racor, a well-known fuel filter supplier, stated, "the real long

term effect on fuel system life is often not adequately considered[,] as much of the engine durability testing performed is done using high quality fuel that doesn't represent the range of fuels seen in the market. Consideration of filtration performance under less than ideal conditions is necessary to develop an acceptable level of protection."[41] Ford never adopted this approach, and instead asked for fuel with a lubricity target score that was much lower than the level set by EPA regulations.

100. Despite this knowledge, beginning with the 2011 model year Ford was touting the improved durability of its Power Stoke 6.7L engine, which was installed in many of the subject Class Vehicles and incorporated the CP4 fuel pump. Indeed, Ford claimed that the Power Stroke improve durability while increasing fuel injection pressure up to nearly 30,000 psi, increasing noise reduction and also tolerating up to 20% biodiesel fuel mixtures.[42] The Power Stroke continued to use the new lower-volume CP4 fuel injection pump, including but not necessarily limited to the 2012-2020 Ford Power Stroke Super Duty trucks equipped with a 6.7L engine.

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[41] Hardison & Pearce, *supra* note 22.

[42] *See* 2011 Ford Super Duty Brochure at 5, available at https://www.ford.com/services/assets/Brochure?make=Ford&model=SuperDuty&year=2011&postalCode=55401 (last accessed May 20, 2020).

101. Some of these vehicles are modified for commercial purposes, such as cargo vans, specialized work trucks, and a variety of ambulances offered by Ford. The CP4 has long experienced problems, and the failure of these pumps can be devastating to people and businesses alike. The CP4 performed terribly from the start, but Ford put it into more and more engines.

102. Further, Ford accepted the fact that U.S. diesel was "out of spec" and chose against hardware changes, acknowledging and rejecting a suggestion from Chevron in November 2009 that "Ford need[s] to change hardware to be more robust instead of counting on the fuel suppliers to improve quality, or ask for tighter lubricity specification."[43]

[43] Nov. 13, 2009, email from Chevron Ornite Company OEM & Industry Liaison Jerry C. Wang to Ford employees re: "TLP09-117 Brief Report on HFRR Lubricity Evaluation of Diesel Fuels," submitted by Ford to NHTSA in response to NHTSA ODI Inquiry No. EA11003, part of compilation of Ford fuel pump-related emails in "Appendix G" to Ford's Jan. 20, 2012 NHTSA submission (document titled "INRD-EA11003-50107P"), at 433. *See also id.* (emphasis added) (Wang presents another option to Ford, stating, "[T]his is an out of spec fuel issue so there is no need to change hardware and hope fuel quality will improve or ***just accept this as fact of life if the warranty is manageable***").

103. In September 2010, when Ford was still experiencing lubricity issues with its diesel HPFPs, Ford engineer Brien Fulton noted that, "Diesel fuel systems and water don't mix, even on the microscopic level."[44]

104. Meanwhile in 2010, under the leadership of Derrick Kuzak, Ford's group vice president of Global Product Development, Ford advertised that its "new diesel engine will deliver significant improvements in torque, horsepower, and fuel economy while adding more fueling flexibility." For 2011, Kuzak promised, "This all-new diesel engine has been so extensively tested both in the lab and in the real world that we're confident we're giving our customers the most reliable and productive powertrain available today." Ford claimed that the new Power Stroke engine could utilize up to 20 percent biodiesel; however, in order to achieve greater fuel efficiency, the Power Stroke engine incorporated a newer, lower-volume fuel injection pump, Bosch's CP4 pump.[45]

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[44] Sept. 17, 2010 email from Ford Diesel Powertrain Systems Technical Specialist Brien Fulton to Ford employees Robin Lawther, Forest Heggie, Karl Burroughs, and Carlos Armesto re: "High pressure fuel systems vs water in diesel fuel," submitted by Ford to NHTSA in response to ODI Inquiry No. EA11003, part of compilation of Ford fuel pump-related emails in "Appendix G" to Ford's Jan. 20, 2012 NHTSA submission (document titled "INRD-EA11003-50107P"), at 365-66.

[45] *See* "A New Era in Ford Diesel Technology for Pickups Starts Now," Ford Social, available at: https://social.ford.com/en_US/story/design/super-duty/a-new-era-in-ford-diesel-technology-for-pickups-starts-now.html (last accessed Oct. 1, 2018).

105. At least as early as 2010, Ford recognized the problem and began looking for ways to blame consumers or fuel supplies for the poor performance of their CP4 pumps:

> 2008–2011 Super Duty, equipped with the diesel engine that have been filled with gasoline, incorrect diesel fuel or other non-diesel fuels can damage the fuel system components, including the High-Pressure Injection Pump and fuel injectors. Non-recommended fuels and additives do not meet the lubricating, cooling and anti-corrosion properties that is required of the fuel system components.

Sept. 8, 2010, email from Ford engineer T. Lusardi to Ford engineer F. Heggie regarding "Tsb water / gas [etc.] in fuel," produced in response to NHTSA Inquiry EA11003, available at https://static.nhtsa.gov/odi/inv/2011/INRD-EA11003-50108P.pdf (last accessed Nov. 29, 2022), at 4. Rather than acknowledge the problem to unsuspecting consumers, Ford would point to "fuel contamination," thereby shifting the blame to the customer.[46]

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[46] *See, e.g.*, Nov. 23, 2009 email from Ford Diesel Drivability Service Engineer Zachary Baker to Ford Diesel Engine Team Leader Derek McCallister re: "6.4 Pump & Injectors," submitted by Ford to NHTSA in response to ODI Inquiry No. EA11003, part of compilation of Ford fuel pump-related emails in "Appendix G" to Ford's Jan. 20, 2012 NHTSA submission (document titled "INRD-EA11003-50107P"), at 8 (emphasis added) (Baker explaining how to deal with customer warranty claims involving HPFP failures as follows: "In the event that fuel contamination is evident (contaminated fuel, corrosion in the secondary filter housing, rusted injector barrels, etc.), ***and there is a catastrophic fuel system failure with debris in the fuel system***, I will advise the dealer that ***the repair will likely not be covered under warranty due to fuel contamination***"); *id.* at 2 (emphasis added)

106. On February 7, 2011, as the first models of the Class Vehicles were being sold, NHTSA investigated Ford for a potential defect in its predecessor diesel high pressure fuel injection pumps as well as certain model year vehicles containing the CP4 pump.[47]

107. In its January 2012 submission to NHTSA, Ford represented the following: "Ford has ensured that the HPFP design in the peer vehicles is compatible with diesel fuels sold in the United States through engine and vehicle testing with the previously referenced diesel test fuels."[48] Ford also represented that, "[d]uring development of the 6.7L engine, Ford . . . addressed the risk of low lubricity fuel by specifying that HPFPs include a 'wear package' that the supplier [Bosch] had developed for pumps that were intended for use in markets where low lubricity fuel

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(Dec. 2, 2009, email from Ford engineer Scott Eeley to fellow Ford engineers Bob Espinoza, Leon Bergeron, Craig Davis, Scot McDonagh, Carlos Armesto et al. re: "6.4 Pump & Injectors," (noting that "[m]ore than 115 ml water in the fuel system is abnormal and indicates excess water in the fuel supply chain. ***Failures caused by non-specified fuel are not covered by Ford Motor Company Warranty—refer to Owners Guide***"); *id.* at 1 (discussing ways for Ford to "reduce warranty costs" by giving Ford service technicians tips for placing blame on consumers, such as identifying a historical "check engine light" diagnostic trouble code in the customer's vehicle data download which indicates that the customer has "ignore[d] the light [and] they should be held responsible (insurance claim)").

[47] The scope of the investigation was the 2008–2012 Super Duty F-Series trucks (NHTSA defect investigation EA11-003:NVS-213hkb).

[48] Jan. 20, 2012, Ford Response to NHTSA Inquiry EA11-003, Document titled, "INRD-EA11003-50102P.pdf," at 20, available at https://static.nhtsa.gov/odi/inv/2011/INRL-EA11003-50102P.pdf.

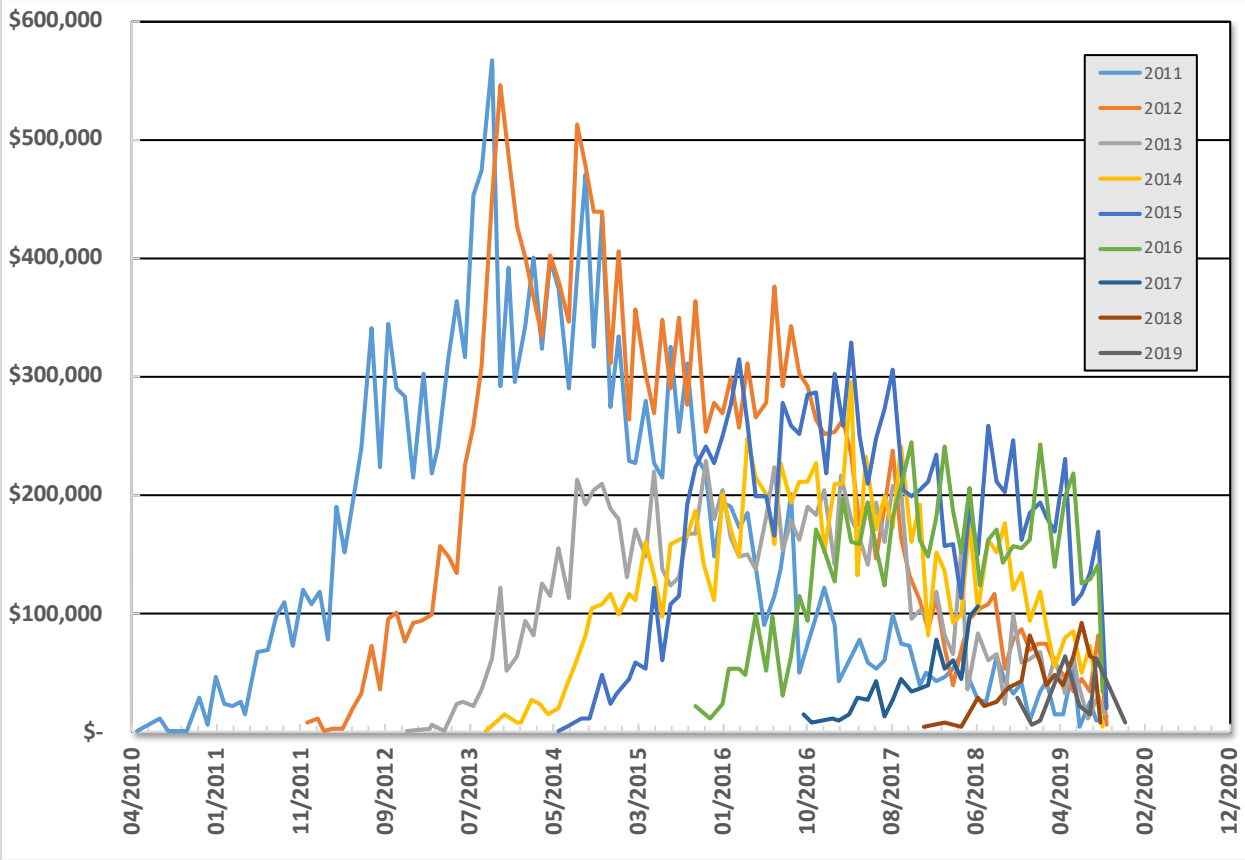
was known to be a concern."[49] This "wear package," if even implemented, was clearly ineffective, and there is simply no way that Ford's aforementioned engine and vehicle testing to "ensure[] that the HPFP design . . . is compatible with diesel fuels sold in the United States" did not show the CP4 pump failing when used with U.S. diesel fuel.

108. The chart below shows the warranty claims based on the Class Vehicle's months in service. This chart is notable in several respects. First, it shows that the defect can manifest at any time, including right after the sale of the vehicle. Second, it shows that the peak in manifestation during a vehicle's service life is around 28-32 months, which is well within the factory warranty period (assuming the drivers did not drive 100,000 miles in two-and-a-half years), and far short of what Bosch represented was the useful life of the pump. This is significant; if the pump did not have an inherently fragile design, the typical pattern of failure would be a small spike in the beginning (for parts that were defectively manufactured or assembled, or "early failures"), then a virtually flat line during the pendency of most of the warranty ("random failures"), then a rise as the warranty period is set to expire

[49] Jan. 20, 2012, Ford Response to NHTSA Inquiry EA11-003, Document titled, "INRD-EA11003-50102P.pdf," at 24, available at https://static.nhtsa.gov/odi/inv/2011/INRL-EA11003-50102P.pdf.

("wear-out failures"). This is known as a "bathtub curve," and it is frequently used in reliability engineering.

Chart 2: Warranty Claims on Months in Service



H. The CP4 Poses an Inherent Risk to Vehicle Occupant Safety and Renders the Class Vehicles *Per Se* Defective

109. The federal Safety Act and related regulations require the quarterly submission to NHTSA of "early warning reporting" data, including claims relating to property damage received by the automotive manufacturer, warranty claims paid by the automotive manufacturer, consumer complaints, incidents involving injury or death, and field reports prepared by the automotive manufacturer's employees or

representatives concerning failure, malfunction, lack of durability, or other performance issues.[50]

110. The Safety Act further requires immediate action when a manufacturer determines or should determine that a safety defect exists.[51] A safety defect is defined by regulation to include any defect that creates an "unreasonable risk of accidents occurring because of the design, construction, or performance of a motor vehicle" or "unreasonable risk of death or injury in an accident." 49 U.S.C. § 30102(a)(8). Within five (5) days of learning about a safety defect, a manufacturer must notify NHTSA and provide a description of the vehicles potentially containing the defect, including "make, line, model year, [and] the inclusive dates (month and year) of manufacture," a description of how these vehicles differ from similar vehicles not included in the recall, and "a summary of all warranty claims, field or service reports, and other information" that formed the basis of the determination that the defect was safety related.[52] Then, "within a reasonable time" after deciding that a safety issue exists, the manufacturer must notify the owners of the defective

[50] 49 U.S.C. § 30166(m)(3); 49 C.F.R. § 579.21.

[51] *See United States v. Gen. Motors Corp.*, 574 F. Supp. 1047, 1050 (D.D.C. 1983).

[52] 49 U.S.C. § 30118(c); 49 C.F.R. § 573.6(b)-(c).

vehicles.[53] Violating these notification requirements can result in a maximum civil penalty of $15,000,000.[54]

111. Importantly, Ford was on notice—and indeed, has repeatedly *admitted*—that the safety risks of moving stalls or "no-starts" such as those associated with the CP4 fuel pump pose an inherent risk to vehicle occupant safety. In August 2016, Ford conducted a safety recall for model year 2015-16 Ford Transit vans equipped with 3.2-liter diesel engines due to "[a] fuel injection pump malfunction" which "may cause the engine to not start or stall without warning and without the ability to restart."[55] Ford further acknowledged that "[a]n engine stall while driving, without warning or the ability to restart can increase the risk of a crash."[56]

112. Based on its duty to monitor safety-related complaints and concerns, Ford assuredly saw ***scores*** of consumer complaints regarding the now-notorious CP4 pump defect.

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[53] 49 C.F.R. §§ 577.5(a), 577.7(a).

[54] 49 U.S.C. § 30165(a)(1).

[55] *See* Aug. 22, 2016, Ford Part 573 Safety Recall Report for NHTSA Recall Campaign No. 16V-618, available at https://static.nhtsa.gov/odi/rcl/2016/RCLRPT-16V618-7678.PDF; *see also* Tom Torbjorsen, *Recall Alert: 2015-2016 Ford Transit*, PICKUPTRUCKS.COM (Aug. 25, 2016), https://news.pickuptrucks.com/2016/08/recall-alert-2015-2016-ford-transit.html.

[56] Ford Part 573 Safety Recall, *supra* note 55.

113. For example, on September 21, 2011, the following story was circulated on RV.net by one sorely disappointed owner of a 2011 F-350 6.7L Power Stroke diesel with only 35,000 miles:

> To all my friends here at Rvnet[:]
>
> I see my issues with my fuel system have traveled to Rvnet. I would have started a thread earlier in the saga but have been very busy. This should have been a simple situation to fix. It has turned into a circus.
>
> Here is the link to the story. It has escalated into an epic event:
>
> http://www.ford-trucks.com/forums/1099978-painful-an-update.html
>
> I wanted to know the facts of the failure before I brought the story here. I wanted to keep rampant speculation and unnecessary commentary out of the discussion. It is really an unfortunate turn of events. The cliff's notes version is as follows:
>
> Truck quit like the key was turned off. It was a Saturday[.]
>
> Ford Roadside assistance towed it to the nearest open Ford facility[.]
>
> This dealer began the service work late on Monday morning.
>
> According to them their diagnostics led them to replace the fuel rail pressure sensor. After waiting a day for the part...still no start[.]
>
> According to them, further diagnostics then led them to the fuel injection control module. The part will be in on Friday afternoon and we will get it out the door before we close...wrong again.

There has been no mention of contaminated fuel up to this point. This is a huge deal because fuel samples should have been taken before any fuel system work was attempted. Now the dealer has 3 days of work where he can not recover any warranty money. Anyone see what's coming?

Now the dealership dance starts. They claim fuel contamination and tell me I am paying. On Monday, they contacted the Ford tech hotline with an exaggerated story about water in the fuel.

I called Ford customer care. After 2.5 hours of discussion over the course of Monday afternoon, I was summarily dismissed with the admonition that the bill for the repairs would be mine. My request to talk to an upper level customer service manger was refused.

I removed the truck from the non servicing dealer. I can not tell you how much fun that was. I had it towed 75 miles to my servicing dealer.

They have begun work on the truck. There is no evidence of water penetration beyond the water separator/primary fuel filter. There was less than 2 ounces of water removed from the separator...if that is where it actually was found...they captured the sample in used drinking water bottles. The under hood secondary filter shows no evidence of ever having water in it. The parts they said were damaged with rust have no signs of rust.

The high pressure fuel pump is toast. There is no evidence present showing water contamination...or any other form of contamination.

Now we wait for the Ford Field Service Engineer I

> am not confident at all that this will be resolved in a fashion that makes me whole."[57]

114. Then, the following day, this same user posted an update, which read as follows:

> Well, another day has slipped by in my ongoing attempt to get my truck fixed under warranty. It has been 12 days since the truck quit. There have been some developments.
>
> First, my dealer has decided that this is unquestionably a warranty repair. His repair and service records on the truck indicate no history of water being found in the separator when they worked on the truck. There can be no long term water presence to do the type of damage that the non servicing dealer tried to claim. Ford technical documents with pictures showing the type of water and rust damage required to void warranty show parts exponentially more damaged than one might expect. My parts show no such damage.
>
> The Ford tech hotline is not cooperating with my dealer. They have refused to send out a Field Service Engineer . . . ."[58]

115. Five years later, this same F-350 owner posts again to his original "Open Roads" enthusiasts forum now that the CP4 issue has gone viral, stating the following (after summarizing his 2011 debacle):

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[57] ricatic, Forum Post re: *My Big Ford Drum is Broke…*, RV.NET (Sept. 21, 2011, 6:50 p.m.), http://www.rv.net/forum/index.cfm/fuseaction/thread/tid/25428988.cfm.

[58] ricatic, Forum Post re: *2011 Duramax and up fuel pump problems*, RV.NET (Jan. 22, 2016, 9:55 a.m.), https://www.rv.net/forum/index.cfm/fuseaction/thread/tid/28726814/srt/pa/pging/1/page/2.cfm (ellipses in original).

> The real cost to fix this problem, at least with Ford, is over $10,000...my repair was $10,300 . . . and if you do not make these repairs to Ford's specification (replace everything but the tank) the engine warranty is flagged[)]. [S]eeing that Ford does not fix many of them under warranty anyway rends that position moot[.]
>
> I close this missive with a comment made to me during my Ford ordeal by the lead engineer at Ford for the 6.7 engine project...paraphrasing for brevity... "I was at Bosch the other day. I walked by two pallets full of failed CP4 pump returns...one Ford and one GM...looked about the same size pile of each..."[59]

116. In a similar vein, on August 1, 2016, the owner of a 2015 Ford F-350 Supercab submitted the following complaint to NHTSA regarding the defective condition:

> 2015 F350 6.7 DIESEL WITH 46,000 MILES THAT IS DOWN BECAUSE [HPFP] IS DEFECTIVE AND SPREADING MEDAL THROUGH SYSTEM. FORD HAS INSPECTED AND SAID IT IS BECAUSE OF WATER IN FUEL, EVEN THOUGH NO WARNING LIGHTS OR CODES ARE AVAILABLE. FORD PULLED SENSORS OUT OF ENGINE AND REJECTED REPAIR BECAUSE OF TARNISH ON SENSORS. THE ONLY CODES WERE FOR (LOW FUEL PRESSURE & REDUCED POWER). NO OTHER CODES. INITIAL INSPECTION REVEALED ABOUT 3/4 INCH OF WATER IN WATER SEPARATOR BUT NO LIGHT OR CODE. THE WARNINGS OCCURRED WHEN TRUCK WAS STARTED AND IT RAN ABOUT 100 FT BEFORE BEING SHUTDOWN AND TOWED

[59] ricatic, Forum Post re: *2011 Duramax and up fuel pump problems*, RV.NET (Jan. 22, 2016, 9:55 a.m.), https://www.rv.net/forum/index.cfm/fuseaction/thread/tid/28726814/srt/pa/pging/1/page/2.cfm (ellipses in original).

> TO DEALERSHIP. THIS APPEARS TO BE A COMMON PROBLEM SINCE FORD OFFERS A REPAIR KIT FOR THIS ISSUE. TOTAL COST OF REPAIR IS BETWEEN $9500,00 & $12,500 DOLLARS AND THIS ON A TRUCK WHICH IS STILL UNDER WARRANTY THAT FORD WILL NOT HONOR. THE TRUCK WASN'T A YEAR OLD UNTIL MAY 2016 AND HAS BEEN DOWN FOR OVER FOUR MONTHS BECAUSE FORD WILL NOT REPAIR. THIS IS THE BOSCH C4 SERIES PUMP. *BF *TR[60]

117. Indeed, Ford is notorious for blaming consumers for this catastrophic failure and blatantly refusing to take responsibility for its own defective vehicle design. By way of example, see the following non-exhaustive list of complaints that consumers have filed with NHTSA regarding the same exact CP4-fueled issue occurring over and over again in Ford diesel vehicles:

- Mar. 21, 2014, 2013 Ford F-250 Supercab customer complaint filed with NHTSA:

> HAD CHECK ENGINE LIGHT COME ON. BROUGHT TO FORD SERVICE 3 TIMES. THE LAST TIME THEY QUOTED ME 11,145 TO FIX SAYING WATER WAS IN FUEL. I THOUGHT IT WAS UNDER WARRANTY, WHICH THEY CLAIM IT IS NOT. MY INSURANCE COMPANY SENT BY AN ENGINEER, WHICH HE SENT FUEL TO INDEPENDENT LAB. FUEL RESULTS CAME BACK NEGATIVE FOR EXCESSIVE FUEL. TRUCK HAS BEEN AT SERVICE CENTER FOR 1 MONTH, WITH NO RESULTS. *TR"[61]

[60] NHTSA ID No. 10892303.

[61] NHTSA ID No. 10576017.

- Jan. 9, 2014, 2013 Ford F-250 Supercab customer complaint filed with NHTSA:

> VEHICLE STALLED AND STOPPED RUNNING IN TRAFFIC ON HIGHWAY 231 IN MONTGOMERY AL. . . . CALLED FORD ROADSIDE ASSIST. I HAVE 125K EXTENDED WARRANTY AND HAD VEHICLE TOWED TO NEAREST FORD DEALERSHIP . . . . VEHICLE WAS DIAGNOSED WITH 'EVIDENCE OF WATER IN FUEL SYSTEM[.'] THERE WAS NO WATER PRESENT IN SYSTEM, NO 'WATER IN FUEL SYSTEM' WARNING LIGHT HAS [EVER] LIT UP ON THIS VEHICLE, HAD IT CHECKED IN THE PAST, WAS TOLD WAS FUNCTIONAL, WAS TOLD REPAIRS WERE 'NOT COVERED' . . . . THE REPAIRS ARE MORE THAN I CAN AFFORD FOR A TRUCK THAT IS UNDER WARRANTY. THIS IS CLEARLY A SYSTEM FAILURE. *TR[62]

- Feb. 12, 2014, 2011 Ford F-350 Supercrew customer complaint filed with NHTSA:

> THE ENGINE LIGHT CAME ON TODAY IN MY 2011 F350 DIESEL. DEALER SAYS DEF PUMP ERROR CODE. DEALER SAYS NO PUMPS AVAILABLE UNTIL 03/15/2014. I THINK FORD SHOULD ISSUE A SERVICE BULLETIN. DEALER SAYS NO WARRANTY. DEALER STATES TRUCK WILL SHUT DOWN AT ANY TIME. THIS SHOULD BECOME A RECALL ISSUE WITH THE NHTSA. OWNERS OF THESE TRUCKS TOW TRAILERS FREQUENTLY WITH LENGTHS IN EXCESS OF 36'. HAVING A TOW VEHICLE SHUT DOWN IN TRAFFIC AT HIGHWAY SPEEDS IS EMINENTLY DANGEROUS AND WILL CAUSE FATALITIES

[62] NHTSA ID No. 10559221.

> REFER TO NHTSA CAMPAIGN NUMBER: 13V535000 ON SIMILAR VEHICLES. *TR[63]

- May 23, 2014, 2011 Ford F-350 Supercrew customer complaint filed with NHTSA:

> THIS DIESEL TRUCK WAS BEING DRIVEN AT 20 MPH WHEN WITHOUT ANY WARNING, THE ENGINE SHUT OFF RESULTING IN LOSS OF ALL POWER STEERING AND BRAKES. WOULD NOT RESTART. TOWED TO DEALER SERVICE. DEALER DIAGNOSED LACK OF FUEL PRESSURE AND THEY OBSERVED METAL SHAVINGS IN THE LOWER FILTER INDICATING THE HPFP WAS DISINTEGRATING. DEALER SUBMITTED PICTURES OF THE FLOW CONTROL VALVE TO FORD WARRANTY PRIOR APPROVAL PER SERVICE MANUAL DIRECTIONS. DEALER OBSERVATION WAS THAT THEY OBSERVED NO SIGNIFICANT WATER OR DEBRIS CONTAMINATION IN THE FUEL FILTER. PRIOR APPROVAL RESPONSE WAS THAT THE PICTURES SUBMITTED WERE REPRESENTATIVE OF FUEL CONTAMINATION AND DENIED THE WARRANTY COVERAGE FOR THE REPAIR. NO WATER IN FUEL INDICATION WAS EVER SEEN BY OWNER. FILTERS MAINTAINED PER MAINTENANCE SCHEDULE. BILL FOR REPAIR IS ESTIMATED AT APPROX $11,000.
>
> TWO WEEKS PRIOR, THIS VEHICLE WAS TOWING A 14K LB 5TH WHEEL DOWN THE SANTIAM PASS IN OREGON. STEEP INCLINES, SHARP DROP OFFS, AND SNOW ON THE ROAD. A SUDDEN LOSS OF POWER WITHOUT WARNING WOULD VERY LIKELY HAVE RESULTED IN LOSS OF CONTROL OF THE VEHICLE, SEVERE BODILY INJURY, OR

[63] NHTSA ID No. 10563967.

> DEATH. IT APPEARS THE BOSCH CP4 FUEL PUMP WAS NOT DESIGNED TO OPERATE WITH THE 560 SCAR FUEL LUBRICITY OF US FUELS AND THAT FORD IS BLAMING PUMP FAILURES ON WATER CONTAMINATION BY OBSERVATION OF A CORROSION APPEARANCE ON ANOTHER COMPONENT. WARRANTY COVERAGE WAS DENIED WITHOUT ANY OBSERVATION OF THE FUEL PUMP ITSELF. NOTE THAT NO INDICATION THAT ANYTHING WAS WRONG WITH THE TRUCK WAS OBSERVED PRIOR TO THE FAILURE. THE TRUCK IS EQUIPPED WITH A FACTORY 5TH WHEEL HITCH AND IS INTENDED TO HAUL UP TO 21.5K LB TRAILERS. SUDDEN LOSS OF POWER STEERING AND BRAKES WITHOUT WARNING UNDER THIS INTENDED USE IS EXTREMELY DANGEROUS. *TR[64]

- Aug. 14, 2014, 2013 Ford F-350 Supercrew customer complaint filed with NHTSA:

> I WAS DRIVING IN MY NEIGHBORHOOD AT ABOUT 25 MPH AND THE ENGINE QUIT, AND WOULD NOT RESTART!! [. . .] THE TRUCK HAD TO BE TOWED TO THE DEALER AND IT HAS [BEEN] THERE FOR OVER A WEEK AND THEY CALLED YESTERDAY AND TOLD ME THERE WERE METAL SHAVINGS IN THE FUEL PUMP AND I DO NOT KNOW IF THE METAL SHAVINGS GOT INTO THE OIL SYSTEM TO RUIN THE ENGINE!! *TR[65]

- Dec. 9, 2014, 2012 Ford F-250 Supercrew customer complaint filed with NHTSA:

> TL* THE CONTACT OWNS A 2012 FORD F-250 SD. THE CONTACT STATED THAT WHILE DRIVING

[64] NHTSA ID No. 10593571.

[65] NHTSA ID No. 10622326.

> APPROXIMATELY 63 MPH, THE REDUCED POWER AND THE CHECK ENGINE WARNING LIGHTS ILLUMINATED. THE VEHICLE WAS TOWED TO A SECOND DEALER, WHO DIAGNOSED THAT THERE WAS AN UNKNOWN SUBSTANCE IN THE FUEL TANK. THE VEHICLE WAS NOT REPAIRED . . . . THE APPROXIMATE FAILURE MILEAGE WAS 18,877.[66]

118. Because the Class Vehicles have an inherent safety defect (as evidenced by the customer complaints cited herein), the purchasers and lessors of the Class Vehicles have been economically injured, because a vehicle which later turns out to have a safety defect is clearly worth less than it was at the point-of-sale while the defect was still being concealed.

I. The Cost of Damage from "Progressive" CP4 Failures Are Significant

119. In addition to catastrophic CP4 failure, there are harmful consequences from the progressive failure that the pump exhibits. Early symptoms of progressive failure of the Bosch CP4 pump include malfunction and failure of the precision common rail fuel injectors. Microscopic metal debris from the CP4 pump may slip past the filter in the metering valve and into the pumping chambers of the CP4 pump, and then flow out to the downstream fuel pipes, fuel rails, and to the injectors, thereby contaminating the whole fuel system with microscopic debris. The openings in the injectors are very small (a few microns), and microscopic pump wear debris

[66] NHTSA ID No. 10663076.

can either hold the injector nozzle needle open, or closed, or slow its opening and closing rate.

120. If the injector nozzle needle is left open too long or stuck open, this will result in gross over-fueling of the combustion chamber, which can lead to progressive damage of the power cylinder (including the piston, rings, block, connecting rod, and crankshaft). Over-fueling can overheat the piston and result in a twisted or melted piston, or burn a hole in the piston. Over-spray penetration can also result in dilution of the lube oil on the power cylinder walls and lead to scuffing and eventual failure of the piston, connecting rod, and the engine block. Severe dilution of the lube oil can also damage engine and rod main bearings and other oil-lubed running surfaces.

121. A stuck or sticking injector which causes over-fueling can also increase fuel consumption and thereby reduce fuel economy. The air-fuel ratio of modern diesels is 18 parts air to one part fuel or higher (18:1–70:1 or what is called "lean burn") for optimal combustion. But when the injectors are sticking open or blocked open, the fueling becomes uncontrolled (by the electronic control unit) and air/fuel ratios can become much richer than design calibration. This increases the potential for white smoke (unburned fuel), black smoke (burned but wasted fuel), combustion pressures, and temperatures and emissions (NOx, particulate matter, CO, CO2, and unburned hydrocarbons) beyond capabilities of exhaust after-treatment systems to

control. Fuel economy will also likely decline since the wasted fuel to produce the smoke is not doing work to produce power, and so miles per gallon should be reduced.

122. In addition, a blocked closed injector (due to wear debris) forces the engine control system to demand more fueling from the remaining functional injectors to compensate for the loss of a power cylinder, and this can also cause reduced performance and increased fuel consumption/reduced fuel economy.

123. In some cases, injector nozzle tips can be broken by wear debris trapped in spray holes or under the nozzle needle seat, essentially turning the injector into an open fuel hose. A broken nozzle tip can result in gross over-fueling which may cause hydraulic lock[67] and bending of the connecting rods. Over-fueling also causes over-temperature conditions which can damage exhaust valves, cylinder heads, exhaust manifolds, turbochargers and after-treatment systems. These progressive damages can occur before the CP4 pump catastrophically fails, and causes noticeable loss of fuel pressure warnings, engine stall, or no start conditions which forces the consumer to seek a repair and pump replacement. Fuel systems contaminated with microscopic

[67] "Hydraulic lock" refers to a condition when the piston hits solid fuel, rather than air or a fuel/air mix.

wear debris must be completely replaced including fuel pressure pipes, rails, pressure sensors and injectors.

124. In short, the Class Vehicles are inherently less durable than previous models because of the CP4 fuel pump defect. Less durability means that Class Vehicle owners will experience more repair costs. CP4 pumps and corresponding fuel injection systems, even when replaced or "fixed," will continue to fail in the Class Vehicles.

125. The Bosch CP4 Pump problem is so prevalent that several automotive parts sellers now provide kits to mitigate the inevitable harm.[68] "CP4 Disaster Prevention Kits" or "bypass kits" usually refer to a fuel bypass system that does not prevent the failure, the loss of the expensive injection pump, or the need to clean metal shavings from the fuel system. But these kits are designed to redirect the lubricating fuel for the CP4 back to the fuel tank, so that it will be filtered before it

[68] *See, e.g.*, online sales listing for "CP4 Disaster Prevention Kit 11-16 6.7L Ford Powerstroke," DieselPowerProducts.com, available at https://www.dieselpowerproducts.com/p-17545-grp-cp4-disaster-prevention-kit-11-16-67l-ford-powerstroke.aspx (last accessed May 20, 2020); online sales listing for "XDP CP4 Disaster Prevention Kit – 6.7L Powerstroke 2011-2019," FullForceDiesel.com, available at https://shop.fullforcediesel.com/xdp-cp4-bypass (last accessed Dec. 2, 2022); online sales listing for "XDP 6.7L Powerstroke CP4 Bypass Kit XD282," XtremeDiesel.com, available at https://www.xtremediesel.com/xdp-67l-powerstroke-cp4-bypass-kit-xd282 (last accessed Dec. 2, 2022).

returns to the engine. The bypass kit directs the fuel contaminated with metal shavings into the gas tank, which is less expensive to clean than the engine and high-pressure fuel system—in other words, a Band-Aid solution. These bypass kits are also less expensive than more complete remedies, requiring only $300-$400 in parts, and are marketed as having the ability to "prevent CP4 failures from contaminating the high pressure fuel system."[69] Many consumers have turned to this sort of remedy preemptively due to the known impending failures their vehicles are facing.

126. Another method of addressing the Bosch CP4 Pump failure is to modify the Class Vehicles to return to the older, more reliable technology of simply using more fuel. With Power Stroke engines, the strategy may be simply to buy a predecessor CP3 pump from an independent automotive parts vendor and install it in place of the Bosch CP4 Pump. Indeed, the CP4 pump is so substandard that many Class Vehicle owners have opted to replace their CP4 pumps with CP3 pumps at a cost of at least $3,000 per vehicle for the replacement parts alone.[70] Resorting to this "remedy" fails to make consumers whole because they are not getting the fuel

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[69] Online sales listing for "6.7L Ford Powerstroke 'Disaster Prevention Kit' (CP4 Bypass Kit)," AccurateDiesel.com, available at https://www.accuratediesel.com/6-7l-powerstroke-disaster-prevention-kit.html (last accessed Dec. 2, 2022).

[70] *See, e.g.*, online sales listing for "2011-2019 Ford 6.7L Dual High Pressure Fuel Kit," HSMotorsports.com, available at https://hs-motorsports.com/products/11-16-ford-6-7l-dual-high-pressure-fuel-kit?variant=7149497188409 (last accessed Dec. 2, 2022).

efficiency promised with the Bosch CP4 Pump, and for which they paid a premium. Further, consumers are having to pay thousands of dollars out of pocket to essentially redesign a design flaw that was intentionally implemented by Ford in the Class Vehicles. The use of the CP3 pump, however, again demonstratest that the real problem is the CP4 pump—not "bad" fuel.

127. Another purported "remedy" is to leave the CP4 in place on the Class Vehicle, but install a lift pump, a second pump to assist the Bosch CP4 Pump and increase the fuel pressure. But, again, this "remedy" deprives consumers of the fuel-efficiency for which they paid a premium.

128. The lift pump and CP3 pump options remedy part of the problem by pumping and burning more fuel. So, in addition to the expense of buying a new fuel injection pump, the "remedies" would require owners to purchase more fuel.

129. A fourth way to mitigate the damage is to spend money for fuel additives to increase the lubricity of the fuel. This approach may work best in conjunction with the previously discussed modifications, but even by itself, it can be expensive.

130. In short, there is no known way to remedy or mitigate CP4 pump failure without decreasing the fuel efficiency promised to Plaintiff and other Class members and without significant expense to Plaintiff and other Class members.

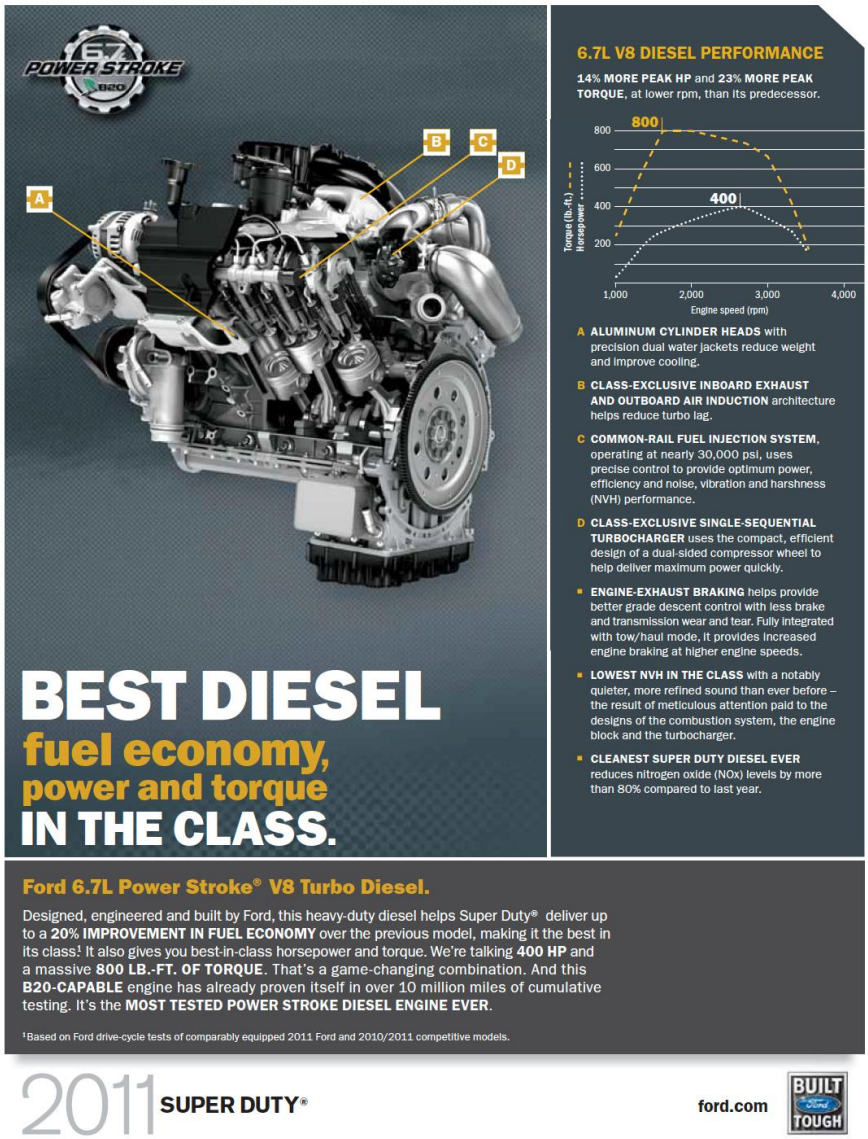
J. Ford knew durability and superiority were material to consumers and falsely promised its trucks were durable and superior.

131. Ford's 2011 Super Duty truck brochures for the 6.7L Power Stroke engine equipped vehicles emphasized the "impressive fuel economy" and "DURABILITY: Super duty is built to the extremely high standards of durability and reliability you'd expect in a full-size pickup that's Built Ford Tough."[71]

132. This same brochure also touted how the 2011 Ford Super Duty's 6.7L Power Stroke diesel engine provided the "BEST DIESEL fuel economy, power and torque IN THE CLASS," with a "**20% IMPROVEMENT IN FUEL ECONOMY** over the previous model, making it the best in its class:"[72]

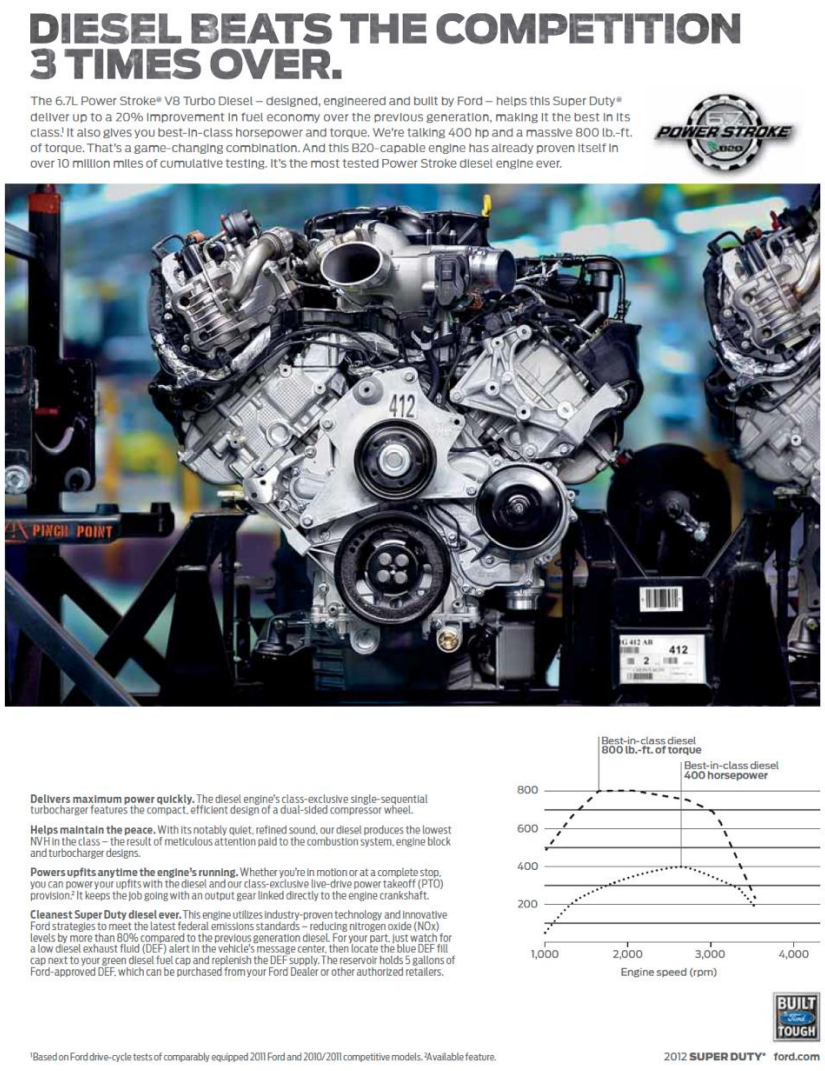
[71] 2011 Ford Super Duty Brochure, at 2, available at https://www.ford.com/services/assets/Brochure?make=Ford&model=SuperDuty&year=2011&postalCode=55401 (last accessed Aug. 7, 2019).

[72] *Id.* at 5.



133. Ford similarly touted its 2012 Super Duty 6.7L Power Stroke diesel trucks as "delivering up to a 20% improvement in fuel economy over the previous generation, making it the best in its class:"[73]

[73] 2012 Ford Super Duty Brochure, at 7, available at http://www.legacydirect.com/brochures/2012_ford_superduty.pdf (last accessed Aug.7, 2019).



134. Similarly, in its advertising materials for the 2013 Ford Super Duty 6.7L Power Stroke diesel truck, Ford noted that, "This Super Duty® has endured more torture testing than any previous generation of Ford Truck—including over 10 million cumulative miles on the most tested Power Stroke® diesel engine ever."[74]

[74] 2013 Ford Super Duty Brochure, at 4, available at https://www.ford.com/services/assets/Brochure?make=Ford&model=SuperDuty&year=2013&postalCode=11738 (last accessed Aug. 7, 2019).

135. The brochure specifically touts Ford's 2013 6.7L Power Stroke Diesel truck as having "[b]est-in-class horsepower, torque and fuel economy," explaining that the truck "delivers 400 hp, 800 lb.-ft of torque, and up to a 20% improvement in fuel economy over the previous generation, making it the best in its class[:]"[75]

DIESEL BEATS THE COMPETITION 3 TIMES OVER.

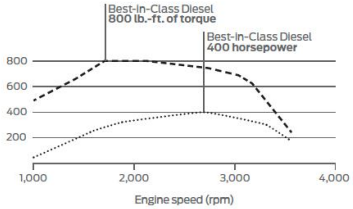
Best-in-class horsepower, torque and fuel economy.[1] The 6.7L Power Stroke® V8 Turbo Diesel gives you all 3. With this advanced engine, Super Duty® delivers 400 hp, 800 lb.-ft. of torque, and up to a 20% improvement in fuel economy over the previous generation, making it the best in its class. Designed, engineered and built by Ford, the 6.7L features many innovative details including aluminum cylinder heads with precision dual water jackets that help minimize weight and maximize cooling. It's also the most tested Power Stroke diesel ever. This B20-capable engine has proven itself in over 10 million miles of cumulative testing under extreme conditions from 120°F scorching heat to -40°F bone-chilling cold. It's Built Ford Tough.®

Cleanest Super Duty diesel ever. This engine generation utilizes industry-proven technology and innovative Ford strategies to meet the latest federal emissions standards – reducing nitrogen oxide (NOx) levels by more than 80% compared to the previous-generation diesel. For your part, just watch for a low diesel exhaust fluid (DEF) alert in the vehicle's message center, then locate the blue DEF fill cap and replenish the DEF supply. The reservoir holds 5 gallons of Ford-approved DEF, which can be purchased from your Ford Dealer or other authorized retailers.

Delivers maximum power quickly. The diesel engine's class-exclusive single-sequential turbocharger features the compact, efficient design of a dual-sided compressor wheel.

Powers upfits any time the engine's running. Whether you're in motion or at a complete stop, you can power your upfits with the diesel and our class-exclusive live-drive power take-off (PTO) provision.[2] It keeps the job going with an output gear linked directly to the engine crankshaft.

Standard TorqShift® 6-speed SelectShift Automatic.² This rugged transmission is also designed, engineered and built by the Ford powertrain team. Its torque converter includes low-speed lockup capability (down to 900 rpm), which enables the engine to run efficiently at lower rpm. The high-strength sinter-metal carrier, with its patented Ford rocker one-way clutch, easily handles the extreme low-end torque of the diesel engine, as well as the high speeds of the gas engine. Plus, a high-capacity, high-efficiency fluid filter extends your fluid- and filter-change intervals up to 150,000 miles.



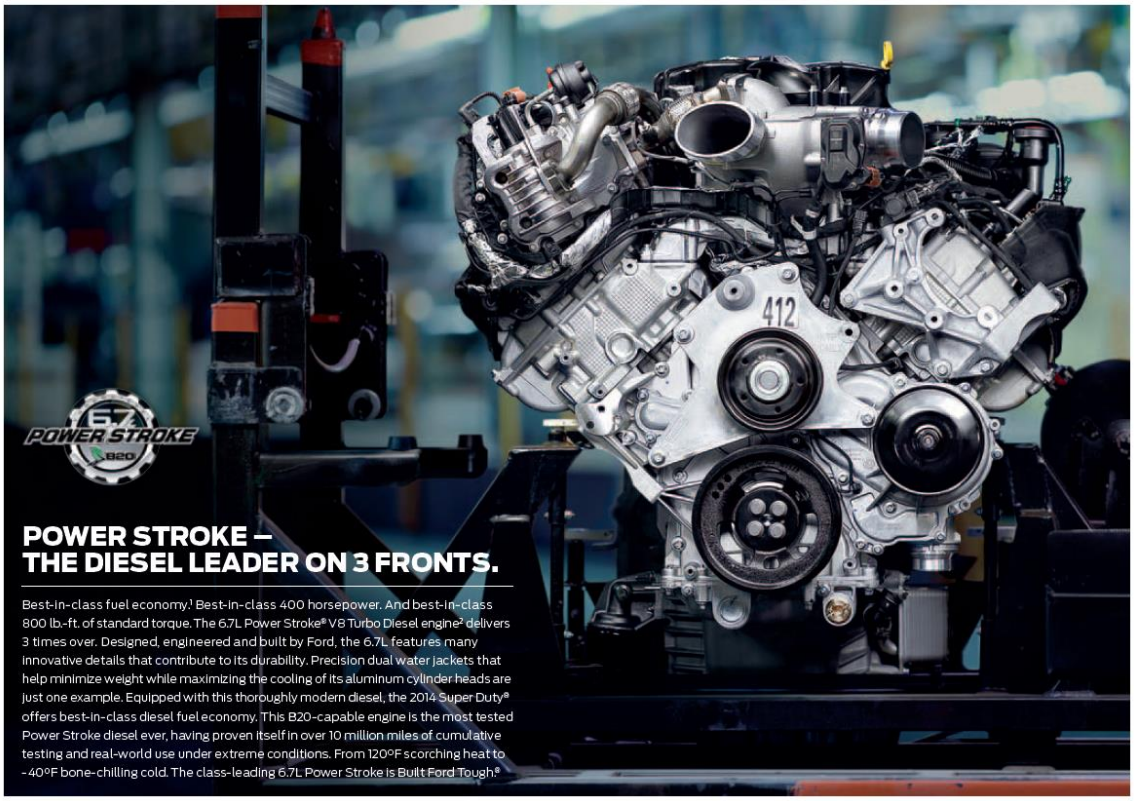
[1]Based on Ford drive-cycle tests of comparably equipped 2011/2012 Ford and 2011/2012 competitive models. [2]Available feature.

2013 SUPER DUTY®
ford.com

BUILT FORD TOUGH

[75] *Id.* at 5.

136. Once again, in 2014, Ford proclaimed that its 6.7L diesel Power Stroke was "[t]he diesel leader on 3 fronts," including "[b]est-in-class fuel economy[,] [b]est-in-class 400 horsepower[,] [a]nd best-in-class 800-lb.-ft. of standard torque," with "innovative details that contribute to its durability:"[76]



137. In its 2015 Super Duty brochure, Ford proclaimed that the 6.7L Power Stroke diesel truck had been "[p]roven in over 12 million miles of cumulative testing and real-world use under extreme conditions," making it "the most tested Power

[76] 2014 Ford Super Duty Brochure, at 4, available at http://cdn.dealereprocess.net/cdn/brochures/ford/2014-f250superduty.pdf (last accessed Dec. 2, 2022).

Stroke diesel ever."[77] Likewise, Ford's television advertisement for the 2015 Ford Super Duty touted its "main ingredient"—the "Ford Super Duty 2nd Generation 6.7 Liter Power Stroke Diesel"—as giving the vehicle "the most horsepower and the most torque in its class."[78]

138. In fact, Ford has represented ***in every single one of its television advertisements*** that Ford Super-Duty vehicles are fit for driving on American roadways, by featuring the Class Vehicles ***driving on American roadways***. For example, in its 2015 "Ford Super Duty Challenge" television advertisements, numerous Class Vehicles are seen traversing all sorts of American terrain as if they are all adequately drivable and compatible with American diesel fuel:[79]

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[77] 2015 Ford Super Duty Brochure, at 4, available at https://www.ford.com/services/assets/Brochure?make=Ford&model=SuperDuty&year=2015 (last accessed Aug. 7, 2019).

[78] 2015 Ford Super Duty Television Advertisement, last aired Dec. 28, 2014, available at https://www.ispot.tv/ad/7jGb/2015-ford-super-duty-main-ingredient (last accessed Dec. 2, 2022).

[79] 2015 "Ford Super Duty Challenge" Television Advertisement, available at https://www.ispot.tv/ad/7icj/2015-ford-super-duty-super-duty-challenge (last accessed Dec. 2, 2022).


SUPER DUTY
CHALLENGE


BEST-IN-CLASS
DIESEL HORSEPOWER & TORQUE
Available 6.7L diesel engine. Class is Full-Sized Pickups over 8,500 lbs. GVWR.

139. Literally, every single Ford advertisement featuring the Class Vehicles falsely demonstrates that the Class Vehicles are compatible with American fuel, ***but they are not.***

140. In Ford's 2016 Super Duty brochure, Ford touted its 6.7L Power Stroke diesel trucks by proclaiming that, "**Best-in-class diesel fuel economy** is maintained with the help of high-pressure fuel injectors that achieve a clean, efficient burn"—and once again, the vehicle is shown *driving* in this *American* advertisement:[80]

[80] 2016 Ford Super Duty Brochure, at 5, available at https://www.ford.com/services/assets/Brochure?make=Ford&model=SuperDuty&year=2016&postalCode=15001 (last accessed Aug. 7, 2019).

141. The following year, Ford proclaimed that its 2017 6.7L Power Stroke diesel truck was "the strongest [] yet" and "[t]he most tested Power Stroke diesel ever," with "class-best 925 LB.-FT. torque" and "unsurpassed diesel fuel

economy"—and once again, the Class Vehicle is driving problem-free in this American advertisement:[81]

142. Ford's television ads for the 2017 Super Duty similarly featured the Class Vehicles driving across all sorts of American terrain, with a voiceover telling

[81] 2017 Ford Super Duty Brochure, at 7, available at https://www.ford.com/services/assets/Brochure?bodystyle=Truck&make=Ford&model=SuperDuty&year=2017 (last accessed Aug. 7, 2019).

consumers to, "Meet the all new 2017 Ford Super Duty,"[8283] and that it is, "Time to imagine what *you* can do in a 2017 Ford Super Duty:"[84]

[82] 2017 Ford Super Duty Television Advertisement, available at https://www.ispot.tv/ad/AuMp/2017-ford-super-duty-punch-work-in-the-face (last accessed Dec. 2, 2022).

[83] 2017 Ford Super Duty Television Advertisement, available at https://www.ispot.tv/ad/A4vZ/2017-ford-super-duty-2017-motor-trend-truck-of-the-year (last accessed Dec. 2, 2022).

[84] 2017 Ford Super Duty Television Advertisement, available at https://www.ispot.tv/ad/wYRV/ford-truck-month-2017-super-duty-trade-assistance (last accessed Dec. 2, 2022).


AMERICA'S
BEST-SELLING BRAND
BUILT Ford TOUGH
Sales claim based on 2016 calendar year sales.

143. What consumers should *actually* imagine is their vehicles going into limp mode or full-on stalling while driving on fast-paced, high-traffic freeways.

144. For the 2018 model year, Ford promised consumers that its 6.7L Power Stroke diesel trucks would "deliver [the Super Duty's] highest combination of horsepower and torque ever."[85] Ford further noted that its "twin -pilot injection delivers smooth, quiet acceleration," and that the trucks' "large fuel tanks—up to 48 gallons maximum—help extend driving range."[86] Most ironically, though, Ford bragged that the "strength and integrity of the 6.7L diesel is maintained by a

[85] 2018 Ford Super Duty Brochure, at 8, available at https://www.ford.com/services/assets/Brochure?bodystyle=Truck&make=Ford&model=SuperDuty&year=2018 (last accessed Aug. 7, 2019).

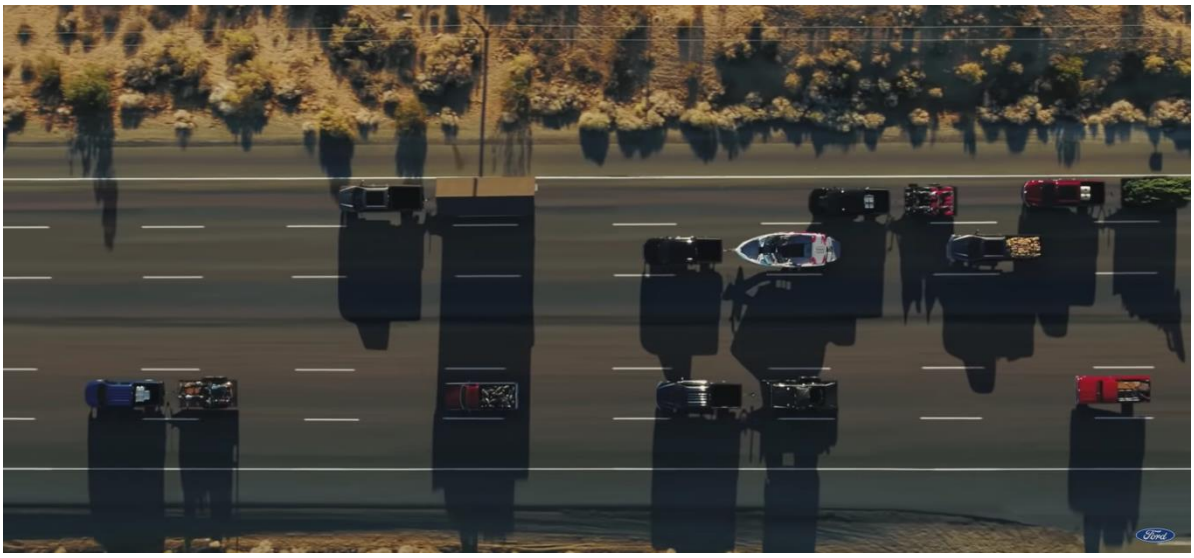
[86] *Id.*

masterful mix of component materials," and that the truck has "excellent throttle response. . . . delivered in part by a high-pressure, common rail fuel injection system . . . [with] piezo-controlled fuel injectors provid[ing] precise injection [and] superior fuel atomization."[87] The advertisement shows the Class Vehicle racing along an uphill highway while towing large bales of hay, promising consumers the performance of a vehicle that is, at base, *compatible with American fuel*:

[87] *Id.*

145. And, in fact, Ford demonstrates the drivability range of *all* of its F-Series trucks in a 2017-2018 ad campaign[88] which, again, falsely demonstrates to consumers that the Class Vehicles are not only "drivable" but able to haul massive trailer loads morning through night—a representation that is defied by the above-mentioned complaints to NHTSA alone:

[88] *See* https://www.youtube.com/watch?v=SR_mGhT2iLM (last accessed Aug. 8, 2019) (video no longer available).




6.7L
POWER STROKE
TURBO DIESEL

146. In addition, Ford provided an express five-year/100,000-mile limited warranty for the 6.7L Power Stroke diesel engine trucks.[89]

[89] *See, e.g.*, 2015 Ford Super Duty Brochure, *supra* note 77, at 24.

147. Ford also represented to Ford Power Stroke diesel consumers that, with respect to the 2011–present 6.7L Power Stroke diesel engine, "You may operate your vehicle on diesel fuels containing up to 20% biodiesel, also known as B20,"[90] and

[90] *See* 2020 Ford Super Duty Owner's Manual, Section entitled, "Fueling and Refueling: FUEL QUALITY—DIESEL," available at http://www.fordservicecontent.com/Ford_Content/Catalog/owner_information/2020-Ford-F250-F350-F450-F550-F600-Owners-Manual-version-1._om_EN_10_2019.pdf (last accessed Dec. 2, 2022); 2019 Ford Super Duty Owner's Manual, Section entitled, "Fueling and Refueling: FUEL QUALITY—DIESEL," at 184, available at http://www.fordservicecontent.com/Ford_Content/Catalog/owner_information/2019-Ford-F-250_350_450_550-owners-manual-version-1_om_EN-US_05_2018.pdf (last accessed Dec. 2, 2022); 2018 Ford Super Duty Owner's Manual, Section entitled, "Fueling and Refueling: FUEL QUALITY—DIESEL," at 189, available at http://www.fordservicecontent.com/Ford_Content/Catalog/owner_information/2018-Ford-250-350-450-450-Owners-Manual-version-1_om_EN-US-EN-CA_10_2017.pdf (last accessed Dec. 2, 2022) ("You should use Ultra-Low Sulfur Diesel fuel (also known as ULSD) designated as number 1-D or 2-D with a maximum of 15-ppm sulfur in your diesel vehicle"); 2017 Ford Super Duty Owner's Manual, Section entitled, "Fueling and Refueling," at 188, available at http://www.fordservicecontent.com/Ford_Content/Catalog/owner_information/2017-Super-Duty-Owners-Manual-version-1_om_EN-US_06_2016.pdf (last accessed Dec. 2, 2022) (stating same); 2016 Ford 6.7 Power Stroke Owner Manual Diesel Supplement, Section entitled, "Fuel and Refueling," at 18–19, available at http://www.fordservicecontent.com/Ford_Content/Catalog/owner_information/2016-Ford-6.7L-Diesel-F-250-550-Supplement-version-1_60l6d_EN-US_04_2015.pdf (last accessed Dec. 2, 2022) (stating same); 2015 Ford 6.7 Power Stroke Owner Manual Diesel Supplement, Section entitled, "Fuel and Refueling," at 18, available at http://www.fordservicecontent.com/Ford_Content/Catalog/owner_information/2015-Ford-6.7L-Diesel-F-250-550-Supplement-version-1_60l6d_EN-US_02_2014.pdf (last accessed Dec. 2, 2022) (stating same); 2014 Ford 6.7 Power Stroke Owner Manual Diesel Supplement, Section entitled, "Fuel and Refueling," at 17, available at http://www.fordservicecontent.com/Ford_Content/catalog/owner_guides/1460l6d1e.pdf (last accessed Dec. 2, 2022) (stating same); 2013 Ford 6.7

provided further directions for which diesel fuel to use if *not* in North America—indicating Ford's obvious expectation that the Class Vehicles would be filled with American diesel fuel.

148. Ford has refused to honor its warranties, claiming that the metal shavings caused by the failures of their pump design voided the warranty because they also caused fuel contamination.

149. In short, Ford induced Plaintiff and other Class members to pay a premium for increased durability, performance and fuel efficiency, with a design it has long known would cause fuel contamination—a condition Ford now uses to absolve itself of the catastrophic and costly consequences to Plaintiff and other Class members.

Power Stroke Owner Manual Diesel Supplement, Section entitled, "Fuel and Refueling," at 15, available at https://dmna.ny.gov/nynm/manuals/Ford_F_350_Owners_Manual_2013_Diesel_Supplement.pdf (last accessed Dec. 2, 2022) (stating same); 2012 Ford 6.7 Power Stroke Owner Manual Diesel Supplement, Section entitled, "Maintenance and Specifications," at 21-22, available at http://www.fordservicecontent.com/Ford_Content/catalog/owner_guides/1260l6d1e.pdf (last accessed Dec. 2, 2022) (stating same); 2011 Ford 6.7 Power Stroke Owner Manual Diesel Supplement, Section entitled, "Maintenance and Specifications," at 21-22, available at http://www.fordservicecontent.com/Ford_Content/catalog/owner_guides/1160l6d1e.pdf (last accessed Dec. 2, 2022) (stating same).

K. Ford's "Certified Pre-Owned" vehicle sales allow Ford to further profit from its fraudulent concealment.

150. Ford also continues to market and sell the Class Vehicles through its "Certified Pre-Owned" program. In so doing, Ford continues to conceal the fact that he Class Vehicles are defective and contain serious safety and functionality defects, while fraudulently representing that these "Certified Pre-Owned" vehicles are free from safety defects and were built with "premium" and superior engineering and design.

151. Indeed, Ford's "Certified Pre-Owned" website promises that every Ford Certified Pre-Owned vehicle "[m]ust pass a 172-Point Vehicle Inspection" so that "[w]hen you purchase a CPO vehicle, you get the confidence of this comprehensive inspection plus manufacturer-backed limited warranty coverage."[91] And this Certified Pre-Owned 172-Point Vehicle Inspection expressly comes with the promise that the vehicle's fuel system has been professionally evaluated.[92] Ironically, Ford touts its Certified Pre-Owned Program as "tak[ing] the risk out of buying a previously owned vehicle,"[93] something that could not be further from the

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[91] https://www.ford.com/certified-used/about-certified/inspection/ (last visited May 20, 2020).

[92] *See id.*

[93] Ford Certified Pre-Owned Brochure, https://www.ford.com/cmslibs/content/dam/brand_ford/en_us/brand/cpo/pdf/

truth with respect to the Class Vehicles. The Certified Pre-Owned package also purports to include a 12-month/12,000-mile Comprehensive Limited Warranty as well as a 7-year/100,000-mile Powertrain Limited Warranty, which *still* does not cover "[r]epairs caused by improper . . . loss of lubricant or fluids or contamination of . . . fuel."[94] In other words, Ford will continue to blame customers when their CP4 fuel pumps catastrophically fail in a "Certified Pre-Owned Vehicle," instead of taking responsibility for the fact that Ford manufactured the Class Vehicles with a fuel pump that is particularly incompatible with U.S. diesel fuel.

152. And yet countless Class members who have purchased Certified Pre-Owned Class Vehicles have received none of the promises Ford promised, when Class members later come to learn that they have been duped into buying an American vehicle that is inherently incompatible with the only diesel fuel they can reasonably be expected to use in America.

L. Allegations establishing agency relationship between manufacturer Ford and Ford dealers

153. Upon information and belief, Manufacturer Defendant Ford has impliedly or expressly acknowledged that Ford-authorized dealerships are its sales

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FCPO00221_FMUC0166000_Ford_Consumer_Brochure_R02.pdf (last accessed Dec. 2, 2022).

[94] Ford Certified Pre-Owned Limited Warranty, http://173.236.95.166/brochures/CPO_Warranty_Ford.pdf (last accessed May 20, 2020).

agents, the dealers have accepted that undertaking, Ford has the ability to control authorized Ford dealers, and Ford acts as the principal in that relationship, as is shown by the following:

a. Manufacturer Ford can terminate the relationship with its dealers at will;

b. The relationships are indefinite;

c. Manufacturer Ford is in the business of selling vehicles as are its dealers;

d. Manufacturer Ford provides tools and resources for Ford dealers to sell vehicles;

e. Manufacturer Ford supervises its dealers regularly;

f. Without Manufacturer Ford, the relevant Ford dealers would not exist;

g. Manufacturer Principal Ford requires the following of its dealers:

1. Reporting of sales;

2. Computer network connection with Manufacturer Ford;

3. Training of dealers' sales and technical personnel;

4. Use of Manufacturer Ford-supplied computer software;

5. Participation in Manufacturer Ford's training programs;

6. Establishment and maintenance of service departments in Ford dealerships;

7. Certify Ford pre-owned vehicles;

8. Reporting to Manufacturer Ford with respect to the car delivery, including reporting Plaintiff's names, addresses, preferred titles, primary and business phone numbers, e-mail addresses, vehicle VIN numbers, delivery date, type of sale, lease/finance terms, factory incentive coding, if applicable, vehicles' odometer readings, extended service contract sale designations, if any, and names of delivering dealership employees; and

9. Displaying Manufacturer Ford logos on signs, literature, products, and brochures within Ford dealerships.

h. Dealerships bind Manufacturer Ford with respect to:

1. Warranty repairs on the vehicles the dealers sell; and

2. Issuing service contracts administered by Manufacturer Ford.

i. Manufacturer Ford further exercises control over its dealers with respect to:

1. Financial incentives given to Ford dealer employees;

2. Locations of dealers;

3. Testing and certification of dealership personnel to ensure compliance with Manufacturer Ford's policies and procedures; and

4. Customer satisfaction surveys, pursuant to which Manufacturer Ford allocates the number of Ford cars to each dealer, thereby directly controlling dealership profits.

j. Ford dealers sell Ford vehicles on Manufacturer Ford's behalf, pursuant to a "floor plan," and Manufacturer Ford does not receive payment for its cars until the dealerships sell them.

k. Dealerships bear Manufacturer Ford's brand name, use its logo in advertising and on warranty repair orders, post Ford signs for the public to see, and enjoy a franchise to sell Manufacturer Ford's products, including the Class Vehicles.

l. Manufacturer Ford requires Ford dealers to follow the rules and policies of Manufacturer Ford in conducting all aspects of dealer business, including the delivery of Manufacturer Ford's warranties described above, and the servicing of defective vehicles such as the Class Vehicles.

m. Manufacturer Ford requires its dealers to post Ford's name, logo, and signs at dealer locations, including dealer service departments, and to

identify themselves and to the public as authorized Ford dealers and servicing outlets for Manufacturer Ford cars.

n. Manufacturer Ford requires its dealers to use service and repair forms containing Manufacturer Ford's name and logos.

o. Manufacturer Ford requires Ford dealers to perform Manufacturer Ford's warranty diagnoses and repairs, and to do the diagnoses and repairs according to the procedures and policies set forth in writing by Manufacturer Ford.

p. Manufacturer Ford requires Ford dealers to use parts and tools either provided by Manufacturer Ford, or approved by Manufacturer Ford, and to inform Ford when dealers discover that unauthorized parts have been installed on one of Manufacturer Ford's vehicles.

q. Manufacturer Ford requires dealers' service and repair employees to be trained by Ford in the methods of repair of Ford's vehicles.

r. Manufacturer Ford audits Ford dealerships' sales and service departments and directly contacts the customers of said dealers to determine their level of satisfaction with the sale and repair services provided by the dealers; dealers are then granted financial incentives or reprimanded depending on the level of satisfaction.

s. Manufacturer Ford requires its dealers to provide Ford with monthly statements and records pertaining, in part, to dealers' sales and servicing of Manufacturer Ford's vehicles.

t. Manufacturer Ford provides technical service bulletins and messages to its dealers detailing chronic defects present in product lines, and repair procedures to be followed for chronic defects.

u. Manufacturer Ford provides its dealers with specially trained service and repair consultants with whom dealers are required by Manufacturer Ford to consult when dealers are unable to correct a vehicle defect on their own.

v. Manufacturer Ford requires Ford vehicle owners to go to authorized Ford dealers to obtain servicing under Ford warranties.

w. Ford dealers are required to notify Manufacturer Ford whenever a car is sold or put into warranty service.

V. TOLLING OF THE STATUTE OF LIMITATIONS

154. As of the date of this Complaint, Ford continues to market its vehicles based on its "Built Ford Tough" motto and claims of superior durability, performance, and fuel efficiency, despite its knowledge that the Class Vehicles are defective and have failed or will fail. In fact, Ford still has not disclosed and continues to conceal that the Class Vehicles are defective, incompatible with

American diesel fuel, and will experience catastrophic and/or progressive CP4 fuel pump failure.

155. Until shortly before the filing of this Complaint, Plaintiff and other Class members had no way of knowing about Ford's wrongful and deceptive conduct with respect to their defective Class Vehicles.

156. As pleaded herein, Ford knew of and failed to disclose a major, inherent product defect, and thus any imposition of "durational limitations" on the warranty breaches or claims alleged herein constitute "overreaching," and therefore any such durational limitations are unconscionable. When a manufacturer is aware that its product is inherently defective, but the buyer has no notice of or ability to detect the problem, there is perforce a substantial disparity in the parties' relevant bargaining power. In such a case, Plaintiff's acceptance of any limitations on his contractual remedies, including any warranty disclaimers, cannot be said to be "knowing" or "voluntary," and thereby renders such limitations unconscionable and ineffective. Ford's superior knowledge of the CP4 defect over the weaker-situated Plaintiff and Class members demonstrates that the underlying vehicle transactions involved elements of deception such that there was significant unconscionability in the bargaining process, and any durational limitations that Ford may purport to assert on Plaintiff's claims are unconscionable as a matter of law.

157. With respect to Class Vehicles that have not experienced a catastrophic CP4 pump failure, Plaintiff and other Class members did not discover and could not reasonably have discovered that their Class Vehicles are defective, that their Class Vehicles are out of specification and incompatible with American diesel fuel, that this incompatibility has resulted in the breakdown of fuel components and contamination of fuel caused by the defective CP4 fuel pump, that their CP4 fuel pumps will fail, that the durability and performance of their Class Vehicles is impaired by this defect and incompatibility and that such durability and performance is far less than Ford promised, or that, as a result of the foregoing, they overpaid for their vehicles, the value of their vehicles is diminished, and/or their vehicles will require costly modification to avoid a catastrophic even more costly failure, and that any such modifications will impair other qualities of the Class Vehicles that formed a material part of the bargain between the parties in the purchase of the Class Vehicles by Plaintiff and other Class members.

158. With respect to Class Vehicles that have experienced a catastrophic CP4 pump failure prior to the filing of this Complaint, Plaintiff and other Class members did not discover and could not reasonably have discovered that their CP4 pump failure was due to a defect known to Ford or that such failure was due to an incompatibility between the Class Vehicle and the fuel intended by Ford to be used in the Class Vehicles.

159. Within the period of any applicable statutes of limitation or repose, Plaintiff and members of the proposed classes could not have discovered through the exercise of reasonable diligence that Ford were concealing the conduct complained of herein and misrepresenting the defective nature of the Class Vehicles.

160. Further, Plaintiff and other Class members did not discover, and did not know of facts that would have caused a reasonable person to suspect that Ford did not report information within their knowledge to consumers, dealerships or relevant authorities; nor would a reasonable and diligent investigation have disclosed that Ford were aware of the non-conforming and defective nature of the CP4 fuel pump and the Class Vehicles in which it was incorporated. Plaintiff only learned of the defective nature of the CP4 fuel injection pump and their vehicles and of Ford's scheme to design and sell such non-conforming and defective fuel pumps and vehicles only shortly before this action was filed.

161. All applicable statutes of limitation and repose have also been tolled by Ford's knowing, active, and fraudulent concealment, and denial of the facts alleged herein throughout the period relevant to this action.

162. Instead of disclosing the defective nature of the CP4 fuel pumps to consumers, Ford falsely represented that CP4 pump failure in the Class Vehicles was caused by Plaintiff's or other Class members' conduct or by the use of contaminated fuel.

163. In reality, Ford's conduct in designing, manufacturing, marketing or selling Class Vehicles for use with American diesel fuel, with which Defendants knew the Class Vehicles were incompatible, causes the "fuel contamination" that ultimately leads to CP4 pump failure.

164. Ford, with the purpose and intent of inducing Plaintiff and other Class members to refrain from filing suit, pursuing warranty remedies, or taking other action with respect to Ford's conduct or the Class Vehicles, fraudulently concealed the true cause of CP4 pump failure by blaming Plaintiff, Class members, and/or contaminated fuel when Ford, even before the design, manufacture or sale of the Class Vehicles, knew that the defective nature of the Bosch CP4 Pump would and has caused fuel contamination and resulting CP4 pump failure.

165. Ford was under a continuous duty to disclose to Plaintiff and other Class members the true character, quality and nature of the durability and performance of Class Vehicles, the ongoing process of fuel contamination in Class Vehicles, CP4 pump failure, and the true cause of CP4 pump failure. Instead, Ford knowingly, affirmatively, and actively concealed or recklessly disregarded the foregoing facts. As a result, Ford is estopped from relying on any statutes of limitation or repose as a defense in this action.

166. For the foregoing reasons, all applicable statutes of limitation and repose have been tolled by operation of the discovery rule and by Ford's fraudulent

concealment with respect to all claims against Ford; and, Ford is estopped from asserting any such defenses in this action.

VI. CLASS ACTION ALLEGATIONS

167. Throughout this Complaint, "Class Vehicle" is defined as the following CP4-equipped, Ford-manufactured, diesel engine vehicles: 2011-present Ford "Super Duty" trucks containing a 6.7L "Power Stroke" diesel engine.

168. Plaintiff brings this action on behalf of himself and as a class action, pursuant to Federal Rule of Civil Procedure 23, on behalf of the following Class:

> **South Carolina Class:** All persons or entities who purchased or leased one or more of the "Class Vehicles" in the State of South Carolina.

169. Excluded from the Class are Ford and its officers, directors, affiliates, legal representatives, employees, co-conspirators, successors, subsidiaries, and assigns, as well as any entity in which Ford has a controlling interest. In addition, Governmental entities and any judge, justice, or judicial officer presiding over this matter and the Members of their immediate families and judicial staff are excluded from the Class. Plaintiff reserves the right to revise the Class definition based upon information learned through discovery.

170. Certification of Plaintiff's claims for class-wide treatment is appropriate because Plaintiff can prove the elements of his claims on a class-wide

basis using the same evidence as would be used to prove those elements in individual actions alleging the same claim.

171. The Class Representative is asserting claims that are typical of claims of the Class, and he will fairly and adequately represent and protect the interests of Class in that he has no interests antagonistic to those of the putative Class members.

172. The amount of damages suffered by each individual member of the Class, in light of the expense and burden of individual litigation, would make it difficult or impossible for individual Class members to redress the wrongs done to them. Plaintiff and other members of the Class have all suffered harm and damages as a result of Ford's unlawful and wrongful conduct. Absent a class action, Ford will likely not have to compensate victims for Ford's wrongdoings and unlawful acts or omissions, and will continue to commit the same kinds of wrongful and unlawful acts or omissions in the future (indeed, upon information and belief, Ford continues to manufacture diesel-engine vehicles with the ticking time-bomb that is the CP4 pump to this day).

173. **Numerosity under Federal Rule of Civil Procedure 23(a)(1):** The Classes are so numerous that individual joinder of all of its Members is impracticable. Due to the nature of the trade and commerce involved, Plaintiff believes that the total number of Class members is at least in the thousands, and are numerous and geographically dispersed across the country. While the exact number

and identities of the Class members are unknown at this time, such information can be ascertained through appropriate investigation and discovery, as well as by the notice Class members will receive by virtue of this litigation so that they may self-identify. The disposition of the claims of Class members in a single class action will provide substantial benefits to all Parties and the Court. Members of the Classes may be notified of the pendency of this action by recognized, Court-approved notice dissemination methods, which may include U.S. Mail, electronic mail, Internet postings, and/or published notice.

174. **Commonality and Predominance under Federal Rule of Civil Procedure 23(a)(2) and 23(b)(3):** This action involves common questions of law and fact which predominate over any questions affecting Plaintiff and Class members, including, without limitation:

a. Whether Ford engaged in the conduct alleged herein;

b. Whether Ford knew about the CP4 defect and the inherent problems related thereto when said component part is used with American diesel fuel, and if so, how long Ford knew or should have known as much;

c. Whether Ford designed, advertised, marketed, distributed, leased, sold, or otherwise placed the defective Class Vehicles into the stream of commerce in the United States;

d. Whether the Ford diesel engine systems that are the subject of this complaint are defective such that they are not fit for ordinary consumer use;

e. Whether Ford omitted material facts about the quality, durability, fuel economy, and vehicle longevity of the Class Vehicles;

f. Whether Ford designed, manufactured, marketed, and distributed Class Vehicles with defective or otherwise inadequate fuel injection systems;

g. Whether Ford's conduct violates the state consumer protection statutes identified herein, and constitutes breach of contract or warranty and fraudulent concealment/omission, as asserted herein;

h. Whether Plaintiff and the other Class members overpaid for their vehicles at the point of sale; and

i. Whether Plaintiff and the other Class members are entitled to damages and other monetary relief and, if so, what amount.

175. **Typicality under Federal Rule of Civil Procedure 23(a)(3):** Plaintiff's claims are typical of the other Class members' claims because all have been comparably injured through Ford's wrongful conduct as described above.

176. **Adequacy of Representation under Federal Rule of Civil Procedure 23(a)(3):** Plaintiff is an adequate Class representative because his interests do not conflict with the interests of the other Class members he seeks to represent.

Additionally, Plaintiff has retained counsel with substantial experience in handling complex class action and multi-district litigation. Plaintiff and his counsel are committed to prosecuting this action vigorously on behalf of the Class members and have the financial resources to do so. The interests of the Class members will be fairly and adequately protected by Plaintiff and his counsel.

177. **Superiority of Class Action under Federal Rule of Civil Procedure 23(b)(3):** A class action is superior to any other available means for the fair and efficient adjudication of this controversy, and no unusual difficulties are likely to be encountered in the management of this class action. The financial detriment suffered by Plaintiff and the other members of the Class are relatively small compared to the burden and expense that would be required to individually litigate their claims against Ford. Accordingly, it would be impracticable for the members of the Class to individually seek redress for Ford's wrongful conduct. Even if members of the Class could afford individual litigation, the court system could not. Individualized litigation creates a potential for inconsistent or contradictory judgments and increases the delay and expense to all parties and the court system. By contrast, the class action device presents far fewer management difficulties and provides the benefits of single adjudication, economy of scale, and comprehensive supervision by a single court.

VII. CAUSES OF ACTION

CLAIMS BROUGHT ON BEHALF OF THE CLASS AND ON BEHALF OF THE NAMED PLAINTIFF

COUNT I

VIOLATIONS OF THE SOUTH CAROLINA UNFAIR TRADE PRACTICES ACT (S.C. CODE ANN. § 39-5-10 *ET SEQ.)*

178. Plaintiff (for purposes of all South Carolina Class Counts) incorporates by reference all paragraphs as though fully set forth herein.

179. Plaintiff brings this Count on behalf of the South Carolina Class members.

180. Ford is a "person" under S.C. Code Ann. § 39-5-10.

181. The South Carolina Unfair Trade Practices Act ("South Carolina UTPA") prohibits "unfair or deceptive acts or practices in the conduct of any trade or commerce." S.C. Code Ann. § 39-5-20(a). Ford's conduct and acts were offensive to public policy or immoral, unethical, or oppressive, thus unfair. Ford's unfair or deceptive acts or practices were prohibited by the South Carolina UTPA.

182. In the course of Ford's business, it willingly failed to disclose and actively concealed that the CP4 fuel pump in the Class Vehicles is particularly incompatible with U.S. diesel fuel such that the normal use of the Class Vehicles causes metal shards to wear off of the pump and disperse throughout the vehicle's fuel injection system, leading to certain component wear and potential catastrophic

engine failure (oftentimes while the vehicle is in motion, causing a moving a stall and subsequent inability to restart the vehicle). Particularly in light of Ford's national advertising campaign, a reasonable American consumer would expect the Class Vehicles to be compatible with *American* diesel fuel. Accordingly, Ford engaged in unfair and deceptive trade practices, in unfair methods of competition, unconscionable acts or practices. Ford's acts had the capacity, tendency or effect of deceiving or misleading consumers; failed to state a material fact that deceives or tends to deceive; and constitute deception, fraud, false pretense, false promise, misrepresentations, or knowing concealment, suppression, or omission of any material fact with the intent that Plaintiff and other Class members rely upon such concealment, suppression, or omission, in connection with the sale of Class Vehicles. Ford engaged in unfair and deceptive business practices in violation of the South Carolina UTPA.

183. In purchasing or leasing the Class Vehicles, Plaintiff and the other Class members were deceived by Ford's failure to disclose that the normal use of the Class Vehicles causes metal shards to wear off of the pump and disperse throughout the vehicle's fuel injection system, leading to certain component wear and potential catastrophic engine failure (oftentimes while the vehicle is in motion causing a moving stall and subsequent inability to restart the vehicle).

184. Plaintiff and Class members reasonably relied upon Ford's false misrepresentations. They had no way of knowing that Ford's representations and omissions were false and gravely misleading. Plaintiff and Class members did not, and could not, unravel Ford's deception on their own, as the Class Vehicles' high-pressure fuel injection systems are a deeply internal component part in the Class Vehicles and Plaintiff and Class members were not aware of the defective nature of the Bosch CP4 fuel pump in that high-pressure fuel injection system prior to purchase or lease. Ford's unfair or deceptive acts or practices, fraud, misrepresentations, suppression, or omission of material facts were likely to and did in fact deceive reasonable consumers.

185. Ford's actions as set forth above occurred in the conduct of trade or commerce.

186. Ford's unfair or deceptive acts or practices, fraud, misrepresentation, concealment, suppression, or omission of material facts were likely to and did in fact deceive reasonable consumers.

187. Ford intentionally and knowingly misrepresented material facts regarding the Class Vehicles with intent to mislead Plaintiff and the Class.

188. Ford knew or should have known that its conduct violated the South Carolina UTPA.

189. Ford owed to Plaintiff and the Class a duty to disclose the truth about the heightened incompatibility of the CP4 fuel pump in the Class Vehicles with U.S. diesel fuel because Ford:

a. Possessed exclusive knowledge of the design of the Class Vehicles and the effect of low-lubricity diesel fuel on high-pressure fuel injection systems in its vehicles, including the uptick in warranty claims it saw upon the introduction of the Bosch CP4 into the Class Vehicles;

b. Intentionally concealed the foregoing from Plaintiff and the Class; and/or

c. Made incomplete representations regarding the quality and durability of the Class Vehicles when used with U.S. diesel fuel, while purposefully withholding material facts from Plaintiff and the Class that contradicted these representations.

190. Due to Ford's specific and superior knowledge that the Bosch CP4 Pumps in the Class Vehicles will fail when combined with U.S. diesel fuel, its false representations regarding the increased durability of the Class Vehicles, and Plaintiff's and other Class members' reliance on these material representations, Ford had a duty to disclose to Plaintiff and the Class members that their Class Vehicles were incompatible with the use of U.S. fuel, that the Bosch CP4 Pumps will fail in

Class Vehicles, that Class Vehicles do not have the expected durability over other diesel vehicles or of their namesake predecessor engines, that failure of the Bosch CP4 Pumps will cause damage to Class Vehicle engine and engine systems, and that Class members would be required to bear the cost of the damage to their vehicles. Having volunteered to provide information to Plaintiff and Class members, Ford had the duty to disclose not just the partial truth, but the entire truth. These omitted and concealed facts were material because they directly impact the value of the Class Vehicles purchased or leased by Plaintiff and Class members. Longevity, durability, performance, and safety are material concerns to diesel truck consumers. Ford represented to Plaintiff and Class members that they were purchasing or leasing vehicles that were compatible with U.S. diesel fuel, when in fact the combination of U.S. diesel fuel with the CP4 fuel pump in the Class Vehicles creates a ticking time-bomb, wherein pump disintegration and component wear begin at the first fill of the tank and it is only a matter of time before catastrophic failure occurs.

191. Ford's conduct proximately caused injuries to Plaintiff and the other Class members.

192. Plaintiff and the other Class members were injured and suffered ascertainable loss, injury in fact, and/or actual damages as a proximate result of Ford's conduct in that Plaintiff and the other Class members overpaid for their Class Vehicles and did not get the benefit of their bargain, and their Class Vehicles have

suffered a diminution in value, and their vehicles are equipped with a defective and destructive CP4 fuel pump. These injuries are the direct and natural consequence of Ford's misrepresentations and omissions.

193. Ford's violations present a continuing risk to Plaintiff as well as to the general public. Ford's unlawful acts and practices complained of herein affect the public interest. Ford's acts were unfair as they are offensive to public policy, immoral, unethical, or oppressive. Specifically: (1) the number of consumers affected by Ford's deceptive practices are in the hundreds of thousands nationwide; (2) Ford has significantly high sophistication and bargaining power with respect to the manufacture and sale of the Class Vehicles to Plaintiff and individual Class Members; and (3) so long as the Class Vehicles continued to be sold and distributed for use with American diesel fuel, the likelihood of continued impact on other consumers is significant. Additionally, Ford's conduct was offensive to public interests because the unfair acts and practices have the potential for repetition.

194. Pursuant to S.C. Code Ann. § 39-5-140(a), Plaintiff seeks monetary relief against Ford to recover for economic losses, reasonable attorneys' fees and costs. Because Ford's actions were willful and knowing, Plaintiff's damages should be trebled. Plaintiff and other Class members also seek any other just and proper relief available under the South Carolina UTPA.

195. Plaintiff further alleges that Ford's malicious and deliberate conduct warrants an assessment of punitive damages because Ford carried out despicable conduct with willful and conscious disregard of the rights and safety of others, subjecting Plaintiff and the Class to cruel and unjust hardship as a result.

COUNT II

VIOLATIONS OF THE SOUTH CAROLINA REGULATION OF MANUFACTURERS, DISTRIBUTORS, AND DEALERS ACT (S.C. CODE ANN. § 56-15-10 *ET SEQ.)*

196. Plaintiff incorporates by reference all paragraphs as though fully set forth herein.

197. Plaintiff brings this Count on behalf of the South Carolina Class members.

198. Ford was a "manufacturer" as set forth in S.C. Code Ann. § 56-15-10, as each was engaged in the business of manufacturing or assembling new and unused motor vehicles.

199. Ford committed unfair or deceptive acts or practices that violated the South Carolina Regulation of Manufacturers, Distributors, and Dealers Act ("Dealers Act"), S.C. Code Ann. § 56-15-30.

200. Ford engaged in actions which were arbitrary, in bad faith, unconscionable, and which caused damage to Plaintiff and other Class members, and to the public.

201. Ford's bad faith and unconscionable actions include, but are not limited to: (1) representing that the Class Vehicles have characteristics, uses, benefits, and qualities which they do not have, (2) representing that the Class Vehicles are of a particular standard, quality, and grade when they are not, (3) advertising the Class Vehicles with the intent to sell them as advertised, (4) representing that a transaction involving the Class Vehicles confers or involves rights, remedies, and obligations which it does not, and (5) representing that the subject of a transaction involving the Class Vehicles has been supplied in accordance with a previous representation when it has not.

202. Ford resorted to and used false and misleading advertisements in connection with its business. As alleged above, Ford made numerous statements about the safety, reliability, and functionality of the Class Vehicles that were either false or misleading. Each of these statements contributed to the deceptive context of Ford's unlawful advertising and representations as a whole.

203. Plaintiff and other Class members bring this action pursuant to S.C. Code Ann. § 56-15-110(2), as the action is one common or general interest to many persons and the parties are too numerous to bring them all before the Court.

204. Plaintiff is entitled to double his actual damages, injunctive relief, the cost of the suit and attorneys' fee pursuant to S.C. Code Ann. § 56-15-110. Plaintiff also seeks treble damages because Ford acted maliciously.

COUNT III

BREACH OF IMPLIED WARRANTY OF MERCHANTABILITY (S.C. CODE ANN. § 36-2-314)

205. Plaintiff incorporates by reference all paragraphs as though fully set forth herein.

206. Plaintiff brings this Count on behalf of the South Carolina Class members.

207. Ford is a merchant with respect to motor vehicles under S.C. Code Ann. § 36-2-314.

208. Under S.C. Code Ann. § 36-2-314, a warranty that the Class Vehicles were in merchantable condition was implied by law in the transaction when Plaintiff purchased his Class Vehicle from Ford.

209. The Class Vehicles, when sold or leased and at all times thereafter, were not in merchantable condition and are not fit for the ordinary purpose for which vehicles are used.

210. The Class Vehicles are inherently defective in that they are particularly incompatible with U.S. diesel fuel such that the normal use of the Class Vehicles causes metal shards to wear off of the pump and disperse throughout the vehicle's fuel injection system, leading to certain component wear and potential catastrophic engine failure (oftentimes while the vehicle is in motion, causing a moving stall and

subsequent inability to restart the vehicle), thereby increasing the risk of serious injury or death.

211. Ford was provided notice of these issues by numerous complaints filed against it, internal investigations, and by numerous individual letters and communications sent by Plaintiff and other Class members.

212. As a direct and proximate result of Ford's breach of the implied warranty of merchantability, Plaintiff has been damaged in an amount to be proven at trial.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff, individually and on behalf of members of the Class, respectfully requests that the Court enter judgment in his favor and against Ford as follows:

A. Certification of the proposed Class, including appointment of Plaintiff's counsel as Class Counsel;

B. An order temporarily and permanently enjoining Ford from continuing unlawful, deceptive, fraudulent, and unfair business practices alleged in this Complaint;

C. Injunctive relief in the form of a recall, free replacement, or buy-back program;

D. Restitution, including at the election of the Plaintiff and Class members, recovery of the purchase price of the Class Vehicles, or the overpayment or diminution in value of their Class Vehicles;

E. Damages, including punitive damages, costs, exemplary damages and treble damages, and disgorgement in an amount to be determined at trial;

F. An order requiring Ford to pay both pre- and post-judgment interest on any amounts awarded;

G. An award of costs and attorney's fees; and

H. Such other or further relief as may be appropriate.

DEMAND FOR JURY TRIAL

Plaintiff hereby demands a jury trial for all claims so triable.

DATED: December 7, 2022

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